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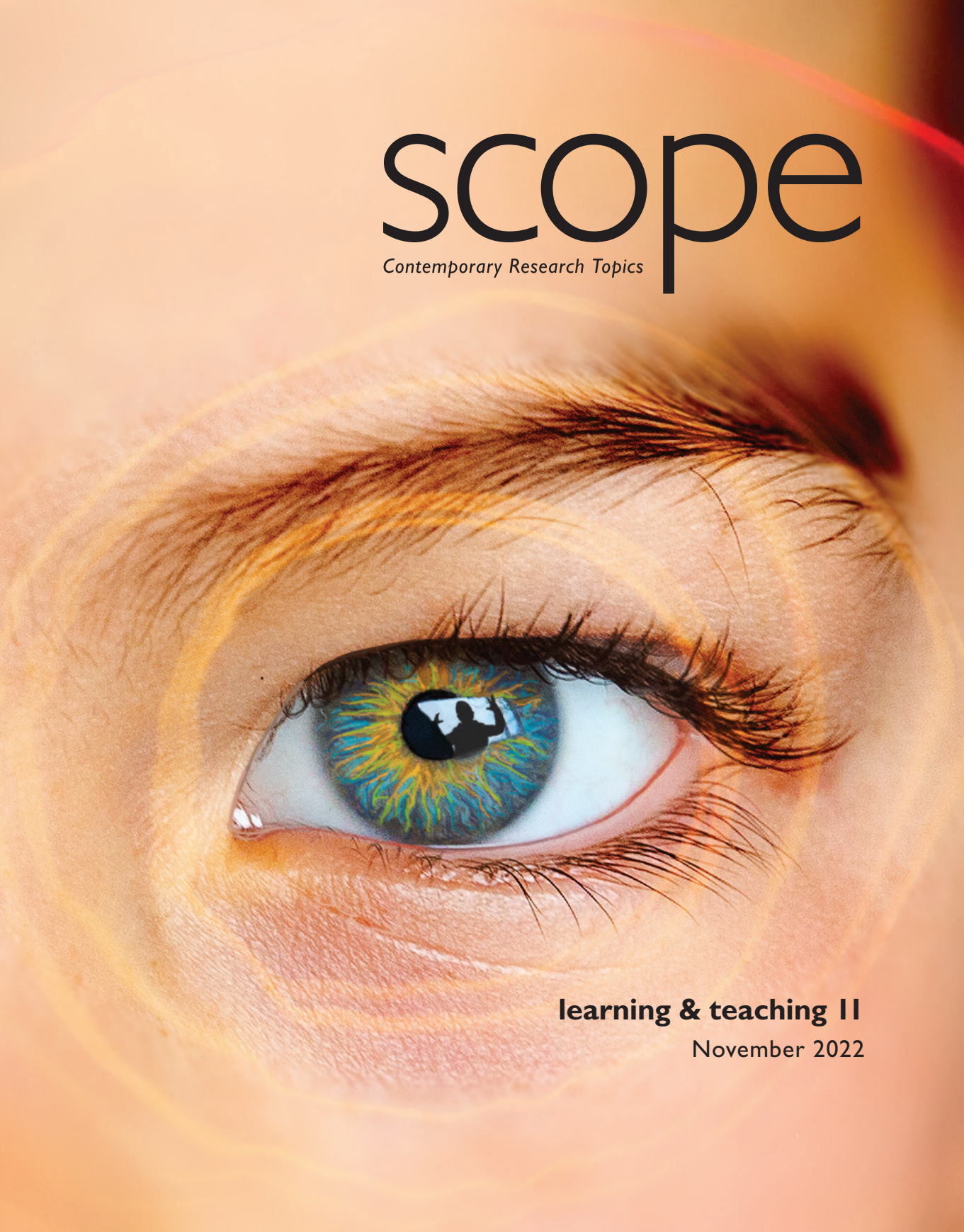

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Scope: Contemporary Research Topics (Learning and Teaching) is concerned with views, critical debate and reflections on learning and teaching theory and practice. It seeks to address current topical matters in the field of tertiary education. Its focus is on building a sense of community amongst researchers from an array of Aotearoa New Zealand institutions with the goal of linking with a wider international community.

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Submissions for *Scope (Learning & Teaching) 12* are invited under an open theme. We are particularly interested in pieces which deal to the opportunities, challenges, concepts and critical thinking that inform contemporary understandings of learning and teaching as we enter a new era of higher education under Te Pūkenga (New Zealand Institute of Skills and Technology).

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Contemporary Research Topics

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DIVERSE EXPERIENCES OF LEARNING AND TEACHING

Trish Chaplin-Cheyne

Welcome to the 2022 edition of *Scope: Learning and Teaching*. The theme for this eleventh edition is the same as the last two years, open, which encouraged a variety of stimulating submissions. Issue 11 provides a forum for our academic staff to share experiences, offer learnings through reflection and affirm a commitment to enhance practice. In addition, this issue includes a special section on neurodiversity and neurodivergence. This emphasis on diverse voices is a timely inclusion as we move into a new era of vocational education through the Polytechnic merger into Te Pūkenga.

TEACHER TRAINING AND EXPERIENTIAL LEARNING

To open this issue, we present recent research on effective teacher training and how best to develop the tertiary educators of the future. Martin Andrew and Oksana Razoumova remind us of the learning value of practicums for emerging educators. Their study examines the rich narratives found within the collected responses of 22 practice teachers who had created portfolios as part of their practicum assessment. Their research findings highlight the importance of providing opportunities for reflection that acknowledge and prepare novice educators for continuing their professional learning journey.

A fascinating article by David Woodward and colleagues provides an insight into the unique transition from subject matter expert to tertiary teacher at Otago Polytechnic (OP). Through a community of practice, this group of recent tertiary education graduates reflect on their first impressions of teaching and co-develop a set of recommendations to be considered moving forward. They highlight the importance of a scaffolded approach that develops tertiary educators from novice to expert, that includes opportunities for mentoring, peer observation, and structured induction processes that are supported within a community of practice.

Complementing this research on tertiary teacher training, Bruno Balducci, Natalie Smith and John Mumford reflect on approaches to learning in classroom and online spaces. Balducci's contribution questions what experiential learning means to tertiary teachers and the impact of this approach on a student's learning experience. His research focusses on the authentic and interactive classroom-based learning practices of Otago Polytechnic lecturers at the Auckland campus. His article emphasises the differing perceptions of experiential learning based on one's teaching context but also finds common themes of student engagement, practicality, authenticity in the world of work, and interactivity both in the classroom and online. Natalie Smith reflects how her experiential learning experiences as a teacher of art history and theory led her to consider implementing this learning theory with her learners through collage. What is key in Smith's article is how she successfully uses collage to aid learners to understand the concepts of sociology through visualisation. Mumford's article also highlights ways to connect subject theory to practice for Information Technology students. Responding to the needs of employers for skilled data analysts to generate business intelligence, Mumford explains how he develops this skill in learners through the application of critical thinking to solve problems using Decision Theory and Decision Support Systems.

ONLINE LEARNING AND RESEARCH

Facilitating effective online delivery has never been more important than it is right now. The three articles on this theme in this issue note both the advantages of online tools and their potential pitfalls. Jerry Hoffman, Robyn Hill, and Warren Smith from the Southern Institute of Technology highlight key strategies that support effective facilitation in this mode. Their research acknowledges these key strategies and explores the online experience from the Master's-level learners' perspective. David Bettis's article continues with the theme of online delivery and provides valuable points to consider when planning for learner interaction. He argues that it is the responsibility of facilitators to ensure the digital tools we are including in our online classes provide learners with the opportunity to become competent technology users.

Philippa Crombie and Cath Fraser in their article give a nod to the phenomenon that is social media but query our reliance on this tool in higher education. They urge caution, especially for novice researchers, in the areas of bias, ethics, credibility, validity and representation if relying on social media to support academic research applications.

ENVIRONMENTAL RESEARCH, COMMUNICATION AND SUSTAINABILITY

Along with online learning, environmental issues and sustainability have become central to educational institutions in the current era. Edgar Burns provides a timely reminder of the urgent need for social change to impact the negative effects of climate change. He explains how teachers must carefully navigate current discourse and reinvent pedagogical practice when communicating topics that can trigger emotional responses. In his article, Burns describes how factual and verifiable science can be communicated and made visible to learners.

At Otago Polytechnic Auckland International Campus (OPAIC), sustainability initiatives became the focus of an internship work-based learning project. The research reported in this article by Marianne Cherrington and others questions learner perceptions with an aim for continual learning and teaching improvement that can be progressed by cohorts in the following teaching block. Whether by good luck or good design this article describes 'sustainability in education.'

David Culliford and Amohia Peka in their article discuss another successful collaboration: a summer scholarship research project investigating estuary habitat health. Through the project, which aimed to quantify kaimoana by measuring pipi, tuangi and tītiko populations in tidal zones across six sites within the Waikareao Estuary, they identify the hidden value of the supervisor / student relationship. Their contribution shows how providing opportunity for our students to lead, better prepares them to be authentic, work-ready practitioners or employees.

NEURODIVERGENCE AND NEURODIVERSITY

> Percy F. … aged 14 … has always been a bright and intelligent boy, quick at games, and in no way inferior to others of his age. His great difficulty has been – and is now – his inability to learn to read. (Shaywitz, 1996, p. 98)

Many of us can relate to the characteristic anomalies associated with learning difficulties. However, the quotation above was retrieved from an article in the *British Medical Journal* printed in 1896. Since this time there have been many theories, hypotheses and definitions of neurodivergence which can appear highly complex and often leave educators and neurodiverse learners at a loss for practical classroom interventions.

This special section focusses on diverse minds and provides valuable insights for educators to better know our learners. Stella Lange opens this section with honest behavioural insight into the needs of neurodiverse learners

and the potential risk of misunderstanding those needs. Amber Fraser-Smith gives an insight into neurodiversity that is backed by science and also provides some support strategies. Amy Benians in her article argues for developing a new learning analytics tool, co-designed with learners, that will support all learners.

Next, we hear from some learner voices. Deane Patterson and Steve Henry reflect on their learning experiences through the neurodiverse lens and discuss the importance of designing for inclusive learning environments. To close the section, Rachel van Gorp provides a personal story describing the value she found in disclosing her neurodivergent self at the inaugural Neurodiversity Symposium, and the ongoing learning she receives as being a member of the Otago Polytechnic Neurodiversity Community of Practice.

We are privileged to present this special section on Neurodiversity and Neurodivergence in *Scope: Contemporary Research Topics (Learning and Teaching) 11*.

Trish Chaplin-Cheyne is the director of Te Ama Ako | Learning and Teaching Development at Otago Polytechnic | Te Kura Matatini ki Otago | Te Pūkenga, where she is responsible for the learning and teaching development service team. This team is tasked with ensuring that OP programmes and courses are designed to best practice standards; that academic staff have the full range of knowledge and skills needed to facilitate learner success; and that learners enjoy an outstanding experience with Otago Polytechnic. She is involved with facilitating on the Graduate Diploma in Tertiary Education and enjoys being in the classroom environment. Trish joined Otago Polytechnic in 2015, as a learning facilitator involved in the Designing for Learner Success initiative. Her areas of particular interest are curriculum and assessment design.

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Article

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DIFFERENT VOICES, DIVERSE JOURNEYS: EXPLORING REFLECTIONS ON PRACTICUM LEARNING

Martin Andrew and Oksana Razoumova

INTRODUCTION

Aspects of the learning practicum related to learners' lived experiences require further investigation at undergraduate and postgraduate levels (Ulvik & Smith, 2015). New models of delivering work-based or -integrated practicums are being implemented, particularly as COVID-19 requires the insights of practitioners in e-practicums (Muller et al., 2022). The teaching practicum is the most tangible, visible reminder of the interdependence of universities and real-world classrooms in teacher education (Santos et al., 2015). In this partnership-based Australian study with relevance to professional practice programmes in Aotearoa New Zealand, we examine how reflective practice, evidenced by learners' artefacts created on practicum, demonstrates emerging teaching ability "in real work situations," as one participant, "Miguel," reflected.

Here, we chart key learning landmarks from practice teachers' reflections (Mattsson et al., 2011). This study aims to contribute to the knowledge base for assessment design in teacher education by drawing on data from 22 practice teachers undertaking practicums. Their portfolios capture their growth and afford researchers access to rich experiential narratives. We demonstrate how critical moments on the practicum journey of practice teachers are experienced and present our discoveries thematically. After Bourdieu (1986), we maintain that the practicum contributes to the evolving formation of the *habitus*, revealing the worth of types of learning that occur. These are the cultural, social and symbolic capital of the practicum, and our study asks: What types of learning do practice teachers describe as the most impactful in their practicum enquiry?

Professional practice, in this case in Teaching English to Speakers of Other Languages (TESOL), occurs in the process of comparing what is observed on practicum with learners' beliefs and pre-formed theories about teaching and learning (Farrell, 2018). This is a complex process of resisting and accepting what appears valuable or not. According to Mayer (1999, p. 2), "comfortable metanarratives [about how to learn to teach]" are rare. Mayer (1999) argues that learning to teach is open to continued and ongoing redefinition. Therefore, she calls for empirical research generating "depth of analysis with [a] specific group of … teachers" over application of theory (Mayer, 1999, p. 2). This study aims to examine reflective practice, evidenced by learners' reflective artefacts created on practicum, and outline key themes in the contextualised journeys of a group of postgraduate students who completed their teaching at sites in West Melbourne.

CONTEXT

This study concerns practice teachers on TESOL practicums on postgraduate qualifications which involve a minimum of 22 days or 60 hours of supervised and planned work experience; in this case, teaching. Practice teachers can operate in a range of vocational language centres, secondary and primary schools, and private or government centres. Working with migrant and refugee adult students in government-sponsored programs such as AMES Australia (Adult Multicultural Education Services) is of particular interest for practice teachers. Another

attractive alternative for completing teaching rounds is a placement in an ELICOS centre (English Language Intensive Courses for Overseas Students) supporting international students, predominantly adults, in improving their English for a range of purposes. Indeed, 99 percent of practice teachers in this research project completed their placements in adult settings. Experienced mentors supervise practice teachers. Supervisors are required to provide constructive feedback on each taught lesson and complete a final report on practice teachers' performance, identifying areas of achievement and areas for improvement. A university colleague visits practice teachers at least once during their practicum to provide formative feedback. Practice teachers are encouraged to visit each other to support peer learning. Combined with a range of units in methodology and applied theory, the programme meets the requirements for further employment in Australia.

Postgraduate practicum is a challenging unit as students who undertake it are not a homogeneous group. Their main motivation is to expand career opportunities. As their teacher beliefs and identity emerge, there are at least two levels of transformation: from a university student into a teacher; and learning to become part of a complex educational setting with its own distinct histories, cultures, practices and discourses (Fitzgerald, 2018). We add one more level – personal construction. At this level, practice teachers form "a personal framework" of practice (Brown & Lee, 2015, p. 541) emerging from the experiences and learnings they identify as valuable.

The practicum requires various types of knowledge, skills and abilities (Brown & Lee, 2015). These types can be brought to two bigger areas: subject matter and the teacher's subjective philosophy. The first type of knowledge includes knowing the aspects of teaching (such as curricular goals, lesson plans, activities and materials). The second relates to teachers' views on what constitutes good teaching. Teachers' belief systems are built gradually over time, so a practicum would be only the beginning of the journey. Any beliefs impacting a practice teacher's emergent philosophy of teaching can be captured in their reflective notes.

The portfolio mode of assessment for professional practice (the practicum unit) allows a trajectory of 'becoming' via reflective practice and enables transformative learning to occur (Andrew & Razoumova, 2017). Whether graded or ungraded, the portfolio is a valuable holistic assessment. It consists of observation notes; reflection on teaching entries; lesson plans, supervisor feedback and a practicum survey. It is a strength-based assessment *for* learning rather than an on-the-day assessment of learning. Becoming a teacher, Graham and Phelps (2003) write, is a multi-faceted process involving individuals intellectually, socially, morally and emotionally.

LITERATURE REVIEW

Three themes permeate the literature informing practicum learning: identity, reflectivity and portfolio assessment. This emphasis is reflected in this brief overview of key literature informing the study. There has been much inconclusive research on how to learn to teach and what knowledge and skills are required to enter a profession (Yunus et al., 2010). This leaves researchers with diverse opportunities to review the practicum (Mayer, 1999; Ulvik & Smith, 2011). One dominant practice for both novice and experienced teachers' professional growth is reflection (reflective practice, reflective action and reflective enquiry) on events in and outside the classroom, a trend echoing Dewey's (1933) call for teachers to participate in reflection (Farrell, 2016). As such, teaching practice can be seen from two sides. First, the 'insider' (emic) view draws on teachers' beliefs about teaching from their experience and perceptions. Farrell (2007) calls these "theories-in-use." A second side sees teaching practice as an ongoing process of forming newly emerging discourses depending on the context and setting, the group of learners and other external (etic) factors.

Teaching how to reflect is a core pedagogical component of preparation for practicum. We define 'reflection' as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (Boude, Keogh & Walker, 1985, p. 19). Focusing on reflectivity helps learners understand the affective, emotional significance of their learning (Kathpalia & Heah, 2008). Expecting novice teachers to engage in a reflective model is challenging. Their first exposure might

result in oversimplistic 'reflections,' "a myriad of judgements about what they experienced" (Walkington, 2005, p. 58). Acquiring a reflective approach to practicum enquiry builds a praxis that involves reflexive integration of thought, desire and action (Pennycook, 2004). According to Posner (2000), non-reflective and non-critical teachers by contrast rely on routine behavior and impulse, tradition and authority.

The practicum is a constant balancing act between received and experiential knowledge (Schön, 1983). This fact echoes Mayer's (1999) distinction between the teachers' functional role and the focus on forming a teacher identity, the process of 'becoming.' Drawing on Gee's (1991) theory of apprenticeship via discourse community interaction, Mayer (1999) argues that "doing the job" and "performing skills" are a good start for "becoming" an expert practitioner. Uzum et al. (2014) maintain that practicum experiences consolidate teachers' emerging understanding of the profession and contribute to their professionalisation. However, to become truly professional requires feeling like a teacher, getting involved personally, sharing knowledge and beliefs, and making a classroom a unique learning space (Graham & Phelps, 2003). Crucially, Ulvik and Smith (2011) stress, practice teachers want to *practise (v)* teaching and experience how it feels to be a teacher.

Considering these insights, we contend that the practicum creates a platform for teachers' socialisation, modelling, reflection and transformation – affordances evidenced in our narratives.

METHODOLOGY

This practitioner research study employed a naturalistic methodology broadly called qualitative descriptive analysis (Sandelowski, 2000). This approach enables exploration of practice teacher experience on its own terms in the manner of Mattsson et al. (2011). We use qualitative descriptive analysis because we present thematic narratives rather than retold stories, and we apply the principles of "evolved" constructivist grounded theory (Mills, Bonner & Francis, 2006). As Charmaz (2014, p. 10) wrote: "We construct our grounded theories through our past and present involvements and interactions with people, perspectives, and research practices … Participants' implicit meanings, experiential views – and researchers' finished grounded theories – are constructions of reality." The researchers identified "indigenous themes" (Patton, 1990) by using a holistic, instinctive, multiple-technique method. The two researchers used cross-checking for reliability and viability (Patton, 1990), comparing notes and generating convergent themes. To apply the thinking of Polkinghorne (1995), we analysed the practice teachers' narratives thematically and re-presented our findings as narrative enquiries. This method adopts word-based and scrutiny-based techniques of observation (Ryan & Bernard, 2003) to query the text, constantly comparing data within the sample. This process enables researchers to locate specific topics that can indicate broad social and cultural themes (Ryan & Bernard, 2003).

This approach has epistemological advantages. First, it enables the voices of participants, speaking through the narratives in their portfolios (their end-of-practicum surveys and their reflections on their practicums), to emerge as authentic data. This, in turn, enables practitioner–researchers to create theme-based narratives of lived experience, "reshaping an experience through narrating" (Barkhuizen, 2011, p. 6). This approach imparts a human-centredness that is central to our beliefs about knowledge creation via interaction in practicum education. The participants' narratives are valuable, situated demonstrations of "how conscious and reflective persons re-present and re-story their memories of events and experiences" (Mishler, 2006, p. 36). Second, treating these data narratively enables us to capture "critical moments" (Pennycook, 2004; Farrell, 2007) or "moments of experience" (Sandelowski, 2000, p. 337) to demonstrate turning points of practice teachers on practicum. Thirdly, it enables the practitioner–researchers, inextricably complicit in the practicum narratives and indeed this academic re-storying of them, to honour themselves as the authors of a reconstruction of experience and meaning (Mills et al., 2006).

Ethics, data collection, participants

We gained ethics approval to use the portfolio texts as data (Victoria University, HRE15-173). The portfolio included: a description of the theoretical underpinning of practice teachers' personal approach to teaching; lesson plans including reflections; the supervising teacher's report, and a set of reflective responses to survey questions designed to capture impressions of the practicum-based learning. For this article, we limit our data to the reflective surveys, aware that they best represent the emergent teaching identity of each participant, capturing experiences of journeying towards professional identity (Uzum et al., 2014; Yunus et al., 2010).

The 22 participants are practice teachers studying in a core postgraduate unit. They range in age from 22 to 70, 30 percent male and 70 percent female. They range in teaching experience from zero to 15 years. As mentioned, 50 percent are native speakers of English. Figure 1 presents the participants.

Participant	Pseudonym	L1 background	Years of experience	Gender	Age
Participant 1	Andrew	Native speaker (NS)	No experience (NE)	M	55
Participant 2	Runa	NS	10	F	48
Participant 3	Amaley	Nonnative speaker (NNS)	10	F	54
Participant 4	Wilson	NS	NE	M	52
Participant 5	Arina	NS	3	F	45
Participant 6	Michael	NNS	2	M	35
Participant 7	Edward	NS	NE	M	59
Participant 8	Ruth	NNS	NE	F	36
Participant 9	Era	NS	2	F	55
Participant 10	Migul	NS	10	M	56
Participant 11	Eva	NS	6 months	F	25
Participant 12	Rebecca	NNS	3	F	25
Participant 13	Ronie	NS	NE	M	73
Participant 14	Max	NS	6 months	M	28
Participant 15	Vera	NS	5	F	37
Participant 16	Andrea	NNS	NE	F	35
Participant 17	Lisa	NNS	3	F	35
Participant 18	Elena	NNS	5	F	36
Participant 19	Grace	NNS	3	F	45
Participant 20	Tania	NNS	2	F	40
Participant 21	Laura	NNS	NE	F	25
Participant 22	Mira	NS	4	F	32

Figure 1. Study participants.

FINDINGS

The three themes reported here relate to our enquiry. Our narratives emphasise learners' increased recognition of the features of an effective teacher and their enhanced potential as creators of informed materials and facilitators of learning. These two themes intersect with our third – how the practicum can enable practice teachers to discover and enact their identities as teachers.

Theme 1: Realising the underpinnings of a good TESOL teacher

One learner on practicum, "Max," was encouraged by his supervisor teacher's words: "You are becoming now a good TESOL teacher." What, however, does it take to become a good TESOL teacher? The initial thread in the responses was the choice of teaching approach. For most novice practice teachers putting into practice a communicative language teaching approach, recognising that learners need to communicate in real-life contexts was a valuable stepping-stone in their teacher development and understanding of what a practicum requires.

With growing confidence in navigating a classroom, for practice teachers a practicum became a space where they moved to more critical reflection to 'test' their strengths in new contexts. Practice teachers were keen to evolve, in "Migul"'s words, "their own method" of teaching, emphasising their own beliefs about what their students needed most. Migul and "Runa," for example, who had been teaching in other disciplines, combined various approaches to teaching their TESOL adult classes:

> The most valuable experience I have gained is to look at my teaching practices from a critical standpoint and ensure that I use strategies that align to theoretical standpoints like critical thinking and the incorporation of multi-literacies. (Migul)

> I was mindful of constructing my lessons around the Communicative Language Teaching method … [and] used a range of other theories, such as TPR (Total Physical Response) and Silent Method for certain activities. My teaching would therefore be an Eclectic Approach. (Runa)

It is not unusual for practice teachers to start with a 'standard' communicative language-teaching approach until they find techniques drawn from a range of methods, blending them to serve the purposes of their teaching and their learners. Practicum allowed practice teachers to consolidate their knowledge and start thinking about their own "framework" of practice (Brown & Lee, 2015) or evolve their personal methodology. "Edward" approached his teaching through forming teaching concepts: "I would have to say that all of my thinking during the practicum focused on three concepts – scaffolding, coaching and interactivity. Teaching techniques were chosen squarely on how they satisfied all three." A solid grasp of theories allowed the practice teachers to expand their teaching via creativity. "Ronie," for instance, wanted to bring drama and performance into teaching technique as an innovation: "I envisioned that I might be able to take my lessons further with excursions out into the real world and teaching English through alternative avenues such as singing, movement and theatre." "Era," a learner with a creative bent, reflected: "Any creativity in this context needs to serve, and be anchored to, a defined, structured and practical learning approach." Avoiding an abstract, metaphorical approach was a challenge for her, but a necessary adaptation for the class.

Max, who obtained their teaching degree as a secondary teacher before they joined a TESOL postgraduate course, found the shift from content teaching to a language-teaching approach based on teaching skills challenging; it turned out to be, as Max put it, "so different." They needed a solid framework for increasing confidence. Max's reflection finishes: "I now have a framework within which to understand where I need to develop my teaching." Challenges mounted when Max realised that working with adult learners requires a more holistic approach and finding topics which are of interest to students.

The theme of breaking established thinking patterns, challenging theories through deconstructing them and applying the resultant innovations, and experimenting fearlessly while adhering to principles, emerged strongly. "Eva" stated: "I would also like to explore the idea of teaching EAL through the arts, sport and/or other recreational activities." Learners were clearly seeking personalised styles of becoming a teacher.

Thoughtful supervision is a major contributor to successful learning for practice teachers. Having a fair and reasonable supervisor is crucial for a practice teacher's confidence to present and receive evaluation. Era notes that the process requires goodwill and good communication. It is not all roses. Runa recalled having to bite her tongue when her supervisor's demonstration seemed not up to her speed. "Elena" felt like an ant in a microscope when her supervisor consulted others about her teaching of a grammar point. "Mira," moreover, clashed with her supervisory teacher, perhaps fearing that her innovative methods and popularity with the learners made her a threat. For the most part, where there was trust, practice teachers engaged with supervisors, creating better lessons as a result, as in "Lisa"'s reflection: "I know I made many mistakes during the practicum … I feel that making those mistakes and having a mentor teacher who is not afraid to be honest and direct was what helped me to improve throughout the practicum." With the support of a supervisor and a receptive class, practice teachers report finding their feet.

Theme 2: Recognising capability to generate good lessons and manage multilingual classes

The many functions required in planning and facilitating a good lesson became obvious during the practicum. The analysis of practicum students' portfolios showed that they focused on their own performance as much as they tried to understand learners. The two overriding functions were: planning an optimal lesson which allowed them to survive under supervision; and evaluating their own ability to run a class: "Finding that topic that draws everyone into the lesson is vital" (Elena). According to "Arina," if the lesson is well-planned and considered then it can "run itself," allowing teachers to focus on interaction. "Andrew" learned the error of over-planning: "I have learnt to teach within time constraints and now I feel that sometimes less equals more." In contrast, "Wilson" found the happy medium: "What I really discovered was that the more I put into research before a class … the better I performed in the classroom." Era learned to trust her imagination: "There's a need to harness this imaginative facility in order to serve specific learning goals/outcomes/student needs." Ultimately, she developed a dictum: "Put simply, ideally teachers need a good brain and a good heart."

"Laura" mirrored what many students mentioned – the importance of flexibility and thinking on your feet in designing an engaging lesson and then tweaking it as the session proceeds in line with the mood of the learners:

> During my practicum, I spent a lot of time preparing each lesson plan ... As such, I realized that I needed to be as prepared as possible, but, more importantly, I needed to be flexible ... I learnt to figure out alternative activities in order to help my day go as smoothly as possible and allow students to gain the most from the lessons.

Engaging learners is key, and the practice teachers cited many strategies. Migul writes: "I like to incorporate authentic learning scenarios in my lesson design." Era's strategy is the personal anecdote: "Students are often most engaged if you relate a personal story to them." Such sharing builds trust, which cements relations. Having a versatile repertoire of topics, she argues, is also crucial: "Classroom teachers … talk about many complex and potentially controversial topics such as obesity, civil war, smoking laws, corporal punishment and addiction." Ronie drew on her life experience to recreate a repertoire of authentic learning stories for students, building trust with "my multinational group of speakers of other languages studying English in their new country: Australia." Finding one's authentic teacher voice and using it comprehensibly – "speed, clarity and complexity" – led Edward to a key critical moment.

Getting to know students individually and respecting their culture also creates good lessons. Max believed learning about them at a personal level was essential as it built trust. Laura struggled with self-disclosure, but gradually, with others sharing stories, came to feel safe to speak about her own life. Eva aimed to build rapport, even as she tried to create an identity as a 'master.' Edward created a bridge to his learners by recalling the theorist Gee's (1991) analogy between language learning and learning to play football: "A football coach can only help a player master it in a group with other apprentices." Wilson noticed a transformation in his class, a movement into comfort, when they mastered a communicative activity with his facilitation. Culture is a tightrope that "Ruth" learned to tread: "You must be active and vigilant while dealing with very diverse communities … I must maintain a balance between my teaching and their cultural belief." Era offers a meditation on her cultural learning being more than about skin colour:

> The practicum has enabled me to learn a lot about teaching, but also about humanity. I was interested by the way people from all parts of the globe often respond the same way to jokes or a moving personal story or an overly pedantic classmate. There truly is much that connects and unites us … To me, the most significant differences are variables like levels of empathy between individuals and degree of self-awareness.

Professional collaboration is another significant contributor to successful lessons. Elena and "Grace" spoke of the privilege of having a group conversation about their practice with a supervising teacher and their peers. Sharing ideas about resources and approaches with certified members of the discourse community enabled others' reflectivity to add confidence to their hunches about creating good lessons.

Theme 3: Finding teacher identity

Edward (whose story appeared in Theme 2) spoke of finding his teacher's voice. It may not have been his authentic, vernacular self, but this persona communicated to learners and as long as he felt well-prepared, he was happy with his performance. The practice teachers struggled with professional personas, with Era stating: "I'm not a 'natural' like some," but also realising that easing into her teacher persona enabled her to see herself as suited to teaching. This realisation came about because of the impact of professional practice (PP) over time: "PP has been something of an eye-opener – my self-concept has shifted a little. I didn't expect this. So, PP has been a more personally informative, even profound, experience than I was expecting." Ronie, too, became acquainted with her teacherly persona: "I gained an awareness of my teacher personality with an ability to be patient particularly with lower-level students." Ruth used her supervisor's advice to find her teacherly self and adjust it to suit: "Now I can say that I am more mature and confident to deliver the content to students."

Those who found their teacher persona contrast with those who discovered 'natural' selves. Edward remarked that his supervising teacher "says that the best teachers make the best use of their natural talents." Wilson stated: "I learned that I am a natural teacher and can put things together relatively quickly if I have to." Arina reflected: "[I have learnt] to trust my instincts and [I have realised] that I actually can do this." Andrew channeled his inner empathetic volunteer to create a natural persona: "I am also interested in doing some volunteer work in a variety of ESL settings to help broaden my knowledge and practical application of ESL teaching methodology." Ronie realised that her long experience working with people from other cultures made her a natural ambassador for the Australian way of speaking: "The practicum gave me an opportunity to build my professional identity as a teacher, consider appropriate body language, my appearance – wearing appropriate clothes and behaving appropriately – with a friendly attitude and a restrained sense of humour."

For some, the practicum was life-affirming. As Wilson said, "The course has confirmed my idea that I would be a good English teacher and it would be something that I would enjoy. I only wish that I had started many years earlier." For Lisa, the journey is one not of being at the destination, but making progress along the way:

> I know that I am capable of receiving feedback and adapting my teaching in subsequent lessons to improve. I know that I am in no way a perfect teacher, and I don't believe that anyone is. I believe that every educator should have a culture of self-reflection and self-improvement.

Learning to teach takes resilience, patience, self-care and, above all, reflectivity. Practice teachers genuinely work on becoming 'good teachers' for their students and creating 'good lessons' – and if 'good' is not achieved it might become a discovery of its own. Their frequent use of emotive words indicates the dominant feelings in the practice students' learning: "complex" (Max); "pleasant and enriching," "relevant" (Migul); "realistic" (Eva); "fascinating, generous and welcoming" (Era); "the first long-term authentic teaching context," "terrific," "humbling," "daunting" (Edward); "invaluable" (Andrew); "warm" ("Amaley"); "challenging" ("Andrea"); "unforgettable" (Grace). Teaching and learning to teach are deeply emotional undertakings – by virtue of teaching being a social activity rather than a rational one, and the linking of emotions and cognition in a complex and non-linear way (Golombeck & Jonhson, 2014; Richards, 2020).

DISCUSSION

Our enquiry asked what types of learning practice teachers find impactful in their practicum learning and indicated three core factors, all bearing on emerging teacher identity and revealing capacities to learn reflectively from observation of and socialisation with mentors; and to create, facilitate and embody principles enacted in preparatory theoretical training. Like much of the recent literature (Graham & Phelps, 2003; Walkington, 2005; Farrell, 2016; Fitzgerald, 2018), this investigation showed that, for this group of practice teachers, becoming a teacher was a complex, personalised process involving building a teaching identity within multiple contexts and went beyond a simply tension-filled attempt to balance theory–practice application during the practicum. The emotion-rich process of 'becoming' is underscored by the participants' language, their reported findings of their teacherly personas, and the transformative nature of practicum. The 'voice' that learners report emerges from their reflection on how naturally they performed, but is also inflected by role model voices they observe, such as that of the supervising teacher. Crucial to this were the opportunities afforded to plan lessons and evaluate their performance, and to receive critical responses from the mentors.

The relational role of the mentor is a significant factor in making a practicum successful. Balancing the twofold expectations – to serve as an experienced role model and a facilitator of practice teachers' professional growth – provides a rich environment for practice teachers to find 'the way' of managing learning and experiencing emotions which intertwine with reflection. Another significant factor – the practicum as a site for trying out ideas (Uzum et al., 2014) – accords, too, with our findings, as shown by Arina, Andrew and Wilson's contrasting experiences of lesson planning. The confidence that comes from supported and successfully evaluated risk-taking is valuable capital. The practicum, then, is best seen as a balance of professional development and skills training. From this balance, an individual's professional frame of practice may emerge (Brown & Lee, 2015).

In terms of application to teaching practice, this study adds to the body of work viewing portfolios as authentic assessment and evaluative evidence for identity-focussed professional learning. These portfolios capture evidence of practice in process, reflecting on and improving teaching, and may serve employment purposes afterwards (Hooley, 2015), hence continuing the identity trajectory. Making teaching visible through collecting teaching-related artefacts also creates context for meaningful learning and reflection (Farrell, 2018), even on such issues as how the teacher may seem to learners, as in Ronie's external visualisation of herself teaching. Our future research plans to investigate how portfolios afford opportunities for experiencing multiple identities: simultaneously learner, teacher, colleague and more.

Portfolios, further, allow practice students and supervising teachers to work collaboratively on a range of tasks. The critical role of this collaboration is clear in leveraging practice teachers' desire to affiliate with the professional community. Era noted a growing appreciation of the profession: "I've long respected classroom teachers as a

profession, but I have even more respect now." Belonging to a potential professional community embodying the practices and discourse of the target profession (Gee, 1991) validated the profession for Era, and others.

CONCLUSION

Our collected responses of 22 practice teachers in relation to their practical learning indicate their realisations of their emerging agency as practitioners and their perceptions of their increased professional capability. Further, they underscore the value of applying theoretical learning from the classroom to professional practice. These results suggest the importance of preparing teachers for discovery, both the usual and the unexpected, in the process of planning, implementing and evidencing practicum work. They also point to new challenges for practicum education, such as the importance of briefing on-site supervisors and the necessity of maintaining timely reflective records as artefacts demonstrating transformative experiential learning. Although the context for the study was TESOL in Australia, the findings and principles unpacked here have broad relevance to vocational programmes delivered in Aotearoa New Zealand and internationally.

Practicum learning affords a fusion of the known and the unknown. The 'safe zone' is what is learnt in the classroom, such as planning lessons, responding to students' questions and selecting engaging activities, while the 'less safe' zone is a place of reflecting in action about initiative and quick thinking in times of being challenged, stumped, confronted, or faced with potential conflict and issues of maintaining face, cultural safety and social cohesion. Our view of the practicum is that the challenge of the unexpected keeps learners inspired in rising to and resolving challenges, continuing their learning journeys within classrooms and the professional community represented by the practicum site.

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EARLY IMPRESSIONS OF TEACHING PRACTICE FROM TERTIARY TEACHING PRACTITIONERS

David Woodward, Shannon Booth, Elise Allen, Alexa Forbes and Jeremy Taylor

INTRODUCTION

A small group of Graduate Diploma in Tertiary Education (Level 7) (GDTE) learners and recent graduates, representing the taught Recognition of Prior Learning (RPL) and Independent Learning Pathway (ILP) programmes at Otago Polytechnic (OP), collaborated as a community of practice (CoP) to write a research article on their early impressions of teaching at OP.

Unlike secondary teachers, subject matter experts entering the tertiary sector are often inexperienced and unqualified as teachers. Our community of practice hence set out to explore the impact of this lack of experience and determine any gaps. We reviewed our early impressions of facilitating or lecturing learners at OP; what enablers and challenges we encountered in those early years; and, upon reflection, what we would recommend being undertaken differently and why.

METHODOLOGY

The teacher community of practice had previously considered examples of teaching philosophy statements and the process of preparing them (Woodward et al., 2018), including enablers, challenges and the use of metaphors (Woodward et al., 2019). Using these tools for developing a teaching philosophy assisted in providing insight into the current research article questions. In 2020 we investigated key evidence-based (Cullen et al., 2017) theories and models that link to teaching practice (Woodward et al., 2020) and then considered constructivism and reflective practice as an evidence-based approach to tertiary teaching (Woodward et al., 2021).

Henry et al. (2020) have identified communities of practice as an effective social constructivist tool for building trust and a sense of belonging, sharing of enterprise and enhancing the reflectivity that is a precursor to independent learning. We therefore employed this social constructivist (Palincsar, 1998) approach to mine information from interviewees, all OP lecturers or facilitators, using an autoethnographic (Maréchal, 2010) approach involving reflection on teaching experience. The community of practice group met online on a regular (fortnightly) basis to explore the research questions, with all interviewees being members of the CoP and authors of the present article.

FINDINGS

Early impressions of facilitating or lecturing learners of Otago Polytechnic

Jeremy joined Capable NZ in January 2018 and has facilitated learners in both the undergraduate and postgraduate domains. Reflecting on his early impressions of facilitating, he believes that the concept of trust and gaining trust to achieve positive learning outcomes have been central themes. As Hoy and Tschannen-Moran (1999) have argued, defining trust is no easy matter; nonetheless, Jeremy has found Levi's (1998) view of trust

apt: Levi describes trust as representing a variety of phenomena that can encourage learners to take risks when dealing with others, and states that when trust is present it helps to move everyone's interests forward. Many of the learners that Capable NZ facilitators engage with have had mixed experiences with mainstream education and, as a result, can arrive with healthy levels of mistrust in the system; specifically, many learners have either had previous negative experiences with educators or have never had an educator that they have trusted. For Jeremy, this has meant a need to consider additional strategies that can break through some of these barriers and, as a key goal, work to build trust between the educator and learner. "Guide, guru, parent, friend – mentors are all these to learners lucky enough to find a teacher willing to make a difference in their lives" (Daloz, 1983, p. 2). This quotation reflects an aspirational approach that, for Jeremy, represents an early guiding principle for assisting learners on their transformational journey.

New to teaching at age 52, Alexa was thrown in the deep end, charged with facilitating a 'wild child' programme, the Graduate Diploma in Sustainable Practice (GDSP). In a previous article, she explored ten years of this programme and the sometimes startling learning it engendered (Forbes & Henry, 2021). In 2018, the programme, and Alexa with it, moved to Capable NZ, where the teaching style and school culture were very different. There was little guidance around how she would fit in and respond to its unarticulated expectations of her. Much of the practice embedded in GDSP delivery was not possible at Capable NZ. For example, the Graduate Diploma in Sustainable Practice had been delivered almost entirely online since 2012, with block courses that explored topics associated with whole-systems thinking. Venue choices were grounded in the idea that it was useful to experience living with far less consumption and what 'enough' might be. This was experiential learning based on reconnecting with nature and self, and exploring frameworks such as the Strategic Framework for Sustainable Development (Holmberg et al., 1999) and The Regenesis Model (Mang & Reed, 2017). Alexa loved this work and its potential for personal transformation, but could not easily continue it at Capable NZ, which required far greater oversight of the events involved.

Elise's pathway to tertiary teaching was quite different, coming as she did from a background in youth development and training. As a member of the Sea Cadet Corps for many years before joining Otago Polytechnic, she had been trained in instructional technique from the age of 15 and had been training others since then. As an adult and a young officer in the New Zealand Cadet Forces (NZCF), Elise had the opportunity to attend a ten-day instructional technique and training management (ITTM) course, later going on to teach on that same course several times. The ITTM course and several previous leadership courses also provided by NZCF covered many aspects of learning design and teaching, from the use of Bloom's taxonomy (Bloom, 1956) for effective learning objectives, sound assessment design practices, lesson planning and reflective practice, through to classroom management techniques, effective questioning and how to set up learning environments to best effect. Thus, Elise's early impressions of lecturing at OP were positive in that her previous training was extremely compatible with teaching professional practice in STEM-oriented programmes. This meant she had plenty of energy left over for learning the processes and practices specific to Otago Polytechnic and adjusting to the workplace culture – a luxury that few new lecturers in the tertiary sector are afforded.

Shannon's journey to tertiary teaching was long and varied. A secondary school teacher by day and an adult educator by night, facilitating antenatal education classes and teaching group exercise classes as a qualified fitness instructor for over a decade, Shannon discovered a real passion for working with adults and decided to leave her secondary teaching career to move into a role based in the tertiary sector. While this was not a teaching role, Shannon knew that tertiary teaching was what pulled on her heart strings and that this role would help her to 'get a foot in the door.' While working in tertiary administration and marketing, she put her hand up to take every teaching-related opportunity that came her way. Shannon completed a GDTE qualification in 2018, facilitated workshops on health and wellbeing for various OP audiences, was a guest lecturer in areas she had specialist knowledge in, assisted academic staff with marking, and embraced every opportunity that would move her closer to her long-term goal of becoming a tertiary educator. The commitment paid off and Shannon is now a full-time lecturer, teaching across three programmes.

While Shannon felt very comfortable in front of the class and competent in managing and motivating her learners, the fact she was a familiar face at OP was the biggest challenge:

> I found that there were minimal crossovers between my professional staff role and my new teaching role, yet because I had been at OP for over five years and was 'part of the furniture' in my department, people assumed I knew all there was to know about being a lecturer here, which was not the case. While the classroom stuff came easily to me, my familiarity meant I went under the radar when it came to being taught the ins and outs of academic life – the systems, the policies, the processes, the boxes that needed to be ticked, and the endless acronyms! This was definitely the most challenging part as a new lecturer.

Enablers and challenges encountered during this early teaching phase

During these early teaching phases, one of the most important challenges Jeremy faced was overcoming his assumptions about teaching and learning, particularly over issues of diversity and the complex needs of learners. Gravells and Simpson (2009, p. 5) define diversity as "valuing and respecting the differences in learners, regardless of ability and/or circumstances or any individual characteristics they may have." The point of valuing diversity is that it can provide learners with safe spaces that allow them to reflect critically about their beliefs, delve more deeply into how these beliefs were formulated and provide guiding frameworks for both compromise and mutual understanding (Harbott, 2017). In a practical sense, valuing diversity can become a significant source of new learning (Napan, 2015). However, the challenge with diversity is that it can be time-consuming to enact, which means that enough time needs to be set aside for the benefits to be actualised. Still, this challenge can be overcome through negotiation and developing individualised learning plans (ILPs) with learners. Jeremy has found that ILPs are a significant enabler to improved learning outcomes, as they can help learners to construct personal academic goals and allow content to be more personalised (UNESCO, 2017). Such an approach has become more important in the last year, as educators have been required to pivot their approach due to the COVID-19 pandemic.

Used to working alongside (but outside) the institution (online and block courses), Alexa found the Capable NZ framework mystifying. For her, more rigour around the course and its administration were required, but processes seemed to be stored in the heads of colleagues. The systems seemed impenetrable, with facilitator manuals that did not articulate how to get from A to B. What standards had to be met? Who assessed and how? People were happy to answer questions, but it was never clear who to ask, or even what to ask. This situation was eventually improved when facilitator and learner handbooks were issued, but would have been so much easier with an induction. Looking back, Alexa realised that the GDSP fitted within Welby Ings' (2017) model of disobedient teaching, where creativity and boundary pushing, backed by reflection, was encouraged. Capable NZ seemed to have the same kaupapa, based in an independent heutagogy (Blaschke, 2012). Challenges in the early GDSP role included some learners wallowing in uncertainty, unable to ground themselves in a worthwhile project, and dealing with neurodiverse learners whom Alexa was ill-equipped to handle as an offsite facilitator with little support. After finding her feet at Capable NZ, Alexa began learning different models from her new colleagues, including the importance of scaffolding learning (Vygotsky, 1978), "fit" with learners, and the transformative powers of reflective practice (Ker, 2017), but struggled with the administration and assessment systems. She noticed for the first time a real drawback of working from home: she was not in a zone of proximity with her colleagues (Vygotsky, 1978) and so missed key opportunities to learn by watching her new peers.

Bringing to the job a certain amount of experience in a youth and adult training context meant that Elise enjoyed confidence in the classroom; however, in the broader picture there were still some novel enablers and challenges. When Elise started teaching at OP a decade ago, she was struck by the phenomenon of academic autonomy whereby even a brand-new lecturer was let loose on a course, with little or no supervision. This trust was

refreshing but could also be a source of worry. Since then, much more robust moderation practices across the whole sector have mitigated this experience somewhat, which is a positive change. One example that Elise found surprising was that she was able to replace the final exam for a course she inherited from her predecessor, without a strict process in place to ensure robust assessment design. Sharing an office with an experienced colleague and mentor meant that the new exam was thoroughly checked before implementation, but at the time it was surprising that this appeared to be an optional approach, such was the trust in the 'content expert' academic.

Besides being left to find her feet on her own, the biggest challenge Shannon experienced was lack of time: time to learn the ins and outs of the role, time to see how all the parts fit together, time to learn 'the unwritten rules,' and especially time to recreate and shape her course content into something she felt was a good fit for her teaching style, and that she felt excited and proud to teach. In their first two years of practice, beginning secondary school teachers are given a significantly reduced teaching workload, as outlined in the Secondary Teachers' Collective Agreement (New Zealand Post Primary Teachers' Association, 2018). This frees up time to work with and be guided by a mentor teacher who will support and give constructive feedback during the journey to becoming a fully certified, registered teacher after two years. Although this period of extra support and time to 'find your feet' as a beginning secondary teacher is not something that is offered in the tertiary sector, Shannon believes the challenges both types of teachers face are very similar:

> I feel very blessed to have had significant teaching experience before I began my tertiary teaching career. I already felt like I was thrown in the deep end trying to get my head around all the various academic jargon and processes, so without the scaffolding approach secondary schools embrace, I can only imagine how challenging it must be for someone brand new to teaching, who may have all the specialist knowledge but not the teaching expertise, to find their feet.

The biggest enabler Shannon has enjoyed is the freedom to shape and teach her courses the way she wants to:

> As long as the learning objectives are covered, how I go about teaching the content is up to me, and I absolutely thrive on this autonomy. I struggle to pick up someone else's lesson plan and run with it. I love the flexibility to be able to shape things to fit the kind of students I have in front of me, and to also be able to shape the content so it works in well with my own personality and the way I like to teach. I want to do all I can to avoid 'death by PowerPoint,' so having the freedom to get creative is a highlight. I just wish there was more time to create the fun, engaging and thought-provoking resources required for the learning activities I invent in my head.

Upon reflection, the recommendations to be undertaken and why

Bassot (2016) notes that reflection can be viewed through the metaphor of a mirror. It is through looking at ourselves in a mirror that we can see ourselves in our entirety and then give serious consideration to what stands before us. As a result of acting on this metaphor, Jeremy has found the framework offered by Brookfield's (1995) Four Lenses helpful to reflect on the early phases of his teaching career. These four lenses can be employed by teachers and correlate with processes of self-reflection, student feedback, peer assessment and engagement with scholarly literature. Using this framework, Jeremy believes he could have been better prepared to guide and mentor his neurodiverse learners, who have become increasingly more common within programmes offered by Capable NZ. Baumer and Frueh (2021, para. 1) have defined neurodiversity as a situation where "people experience and interact with the world around them in many different ways; there is no one 'right' way of thinking, learning, and behaving, and differences are not viewed as deficits." During these early facilitation experiences Jeremy had limited strategies in place. As a result of reflection and considering what he would change if he had

the chance again, he would have augmented his reading around the topic and would have sought more feedback from learners. Subsequently, Jeremy has implemented strategies around delivering a more inclusive learning environment and embedding more inclusive strategies into his facilitation toolkit (Mirfin-Veitch et al., 2020).

All new academic staff have the opportunity to undertake the GDTE programme – a Level 7 qualification which covers the major theories and practices of education – when they begin their teaching careers at Otago Polytechnic. However, for those who have never stood in front of a classroom before, Elise feels that a more practical course of training might be a beneficial place to start. In order to provide the best learner experience, a teacher must have skills such as lesson planning, classroom management and good questioning technique, as well as a basic understanding of constructive alignment (Biggs, 2003). An introduction to some simplified, broad pedagogical theories would be useful if accompanied by some practical application in the classroom; for example, the application of the primacy and recency effects (Murdock, 1962) in the effective introduction and conclusion of the lesson. Only once the new teacher is comfortable with the mechanics and practical skills of teaching would a more in-depth exploration of educational theory be helpful.

Shannon feels that the tertiary sector could learn a lot from the way secondary school teachers are supported in their initial teacher journeys. Tertiary educators often end up in their roles due to their specialist knowledge in a certain area, yet this knowledge is not always paired with teaching expertise. As a result, Shannon suggests that these staff should be offered the same support, guidance and mentoring opportunities as their secondary counterparts:

> For staff beginning their teaching journey as tertiary lecturers, whether they have taught before or not, I believe a detailed and ongoing induction process should be undertaken where staff are given the time, support and resources to familiarise themselves with the processes specific to their institution and the department that they work in. Having a checklist and buddying up with an experienced lecturer within the organisation could help with this process or, better yet, employing someone specifically to fulfil this role, as other teaching staff are often tied up with their own workloads and may find it hard to juggle yet another responsibility on top. However the mentoring is undertaken, it needs to be ongoing – not just for the first couple of weeks, but throughout the first year at least, until that staff member feels familiar and comfortable in their role.

Shannon believes that having good systems in place is a priority. That means having an induction, no matter how qualified you are for the job. Culture is important and you need to understand the culture of your workplace – even the new department of the same organisation. This includes making sure that you are grounded and scaffolded with manageable steps that offer a clear direction and indication of what is expected.

Alexa agrees. Achieving the GDTE changed everything as she moved from being a subject-matter expert, teaching as she would want to learn, to someone who knew how to observe her learners and employ strategies and tools to keep them on track. One key was creating an environment for learning and strong scaffolding. This limited learner overwhelm and subsequent wallowing. Another important element was the understanding that no effort is wasted. Wrong directions and pivots of projects are part of the process and serve to empower new directions. Studying te reo Māori and te ao Māori have influenced her world view and engendered different responses to learner issues, as has colleague whānaukataka. A lightbulb moment came from reading this quotation from Isaac Newton (2017) in DPP graduate Mawera Karetai's (2021) literature review:

> Bernard of Chartres used to say that we [the Moderns] are like dwarves perched on the shoulders of giants [the Ancients], and thus we are able to see more and farther than the latter. And this is not at all because of the acuteness of our sight or the stature of our body, but because we are carried aloft and elevated by the magnitude of the giants.

DISCUSSION

Tertiary educators often enter the tertiary sector based on their subject matter expertise rather than their teaching skills; the latter are assumed. However, becoming a dual professional, with both subject matter and teaching expertise, can be a challenging journey.

Novice to expert – An example related to teaching

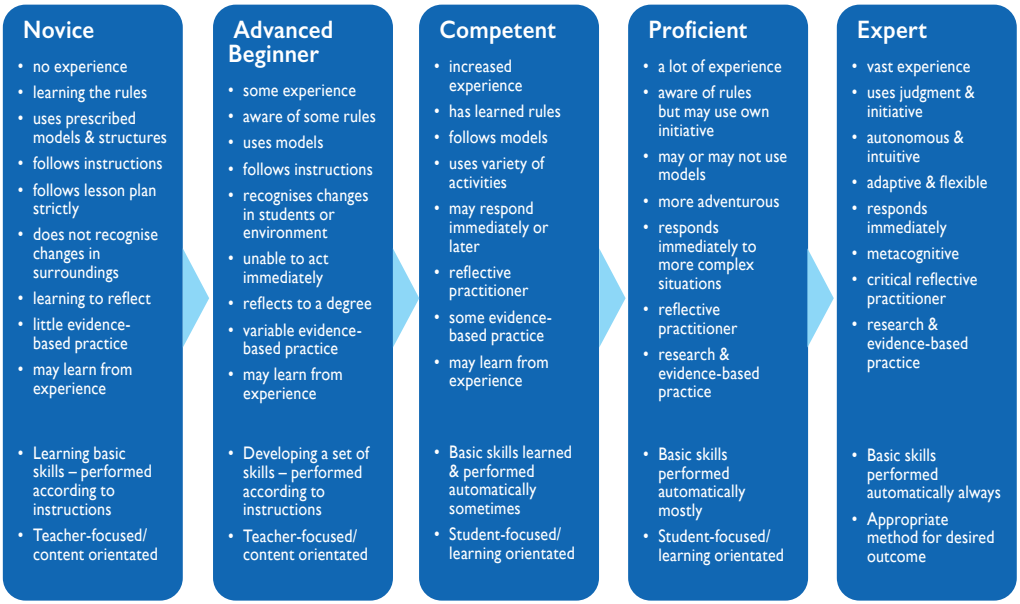

Figure 1. Novice to expert in teaching (Bronwyn Hegarty, 2015; adapted from Dreyfus, 2004; Gossman, 2008).

The Dreyfus (2004) model of "novice to expert," adapted by Hegarty (2015) to teaching (see Figure 1), considers the level of expertise of a practitioner on a five-stage continuum (Lyon, 2015). To progress along the continuum, tertiary educators must negotiate a number of hurdles and employ many enablers.

For many new teaching practitioners, the challenges of the tertiary sector include understanding a new system and culture, including the 'unwritten rules,' complying with administrative box-ticking, understanding acronym terminology, overcoming assumptions, knowing the correct assessment procedures, having a proper induction process, finding off-campus learner support, understanding moderation processes and constantly being time-poor. Tertiary teachers may be faced with developing course content, delivering to neurodiverse learners, developing new technology skills for a blended learning (Garrison & Vaughan, 2008) model, being able to pivot to deliver both in the classroom and online in a COVID-19 environment, and undertaking teaching qualifications, all at the same time.

Enablers that may assist negotiating this minefield include valuing diversity, developing individual learning plans to set goals for learners, having learner guides and facilitator handbooks, leadership training, learning design and teaching courses, understanding Bloom's taxonomy (Bloom, 1956), developing lesson plans and learning objectives, classroom management, creating inclusive learning environments for learners and being a critically reflective practitioner.

Other enablers include the importance of developing trust with a learner who may have had a previously negative educational experience, listening to and learning from learners and changing teaching according to their needs, using an Ako framework. Scaffolding learners into the zone of proximal development (Vygotsky, 1978) is important, along with having a relatively autonomous approach to content and assessment development and being able to develop one's own lesson plans in line with learning outcomes. Teaching learners that it is alright to make mistakes, as it is all part of the learning process, is also key.

Significant changes have been made to the GDTE at OP in the last two years. These include a revised staff induction process, digital skills self-assessment, development of learning resources, hui Tūhoto involving regular meetings to connect teachers, peer observations, and a one-day introduction to teaching workshop – a preamble to undertaking the GDTE, covering practical aspects of teaching such as lesson planning, constructive alignment, designing experiential learning activities and formative feedback strategies. OP also has a neurodiverse community of practice which started in 2021, initiated for teachers by Te Ama Ako. Currently, after six months, new staff begin the GDTE journey, undertaking the first two Level 5 courses – Fundamentals of Learning and Teaching; and Facilitating Learner Success, with a focus on the applied theory. In both these courses observations are included, mentors are recommended, and new teachers are scaffolded to segue into the Level 7 GDTE courses. New courses are also being developed, with the launch of a third Level 5 GDTE course, specifically for facilitating digital learning (online learning and creating whānaukataka), in the second semester of 2022.

RECOMMENDATIONS

To progress rapidly along the novice-to-expert continuum (Dreyfus, 2004), facilitators and lecturers need to undertake teacher induction training when they first join a tertiary organisation, rather than several years later. Training, such as the one-day introduction to teaching workshop, could be delivered in the first 'induction week' of employment. Such training does and should cover administration; facilitating digital learning (classroom and online); basic practical teaching skills and techniques including lesson planning, classroom management, good questioning technique; a basic understanding of constructive alignment (Biggs, 2003); and practical application of teaching in the classroom, such as effectively initiating and concluding a lesson.

Teacher induction training should also cover dealing with neurodiverse learners, creating an inclusive learning environment, using strategies to keep learners engaged and becoming a critically reflective teacher. During the induction week, novice teachers should have an opportunity to observe expert teaching practitioners in a teaching classroom context, using a situated learning model (Lave and Wenger, 1991).

Mentoring, a form of social cognitive theory (Daloz, 2012; Mullen, 2005), should be practiced between the novice and an experienced teaching mentor during the first year of teaching; and through peer observations (Harris et al., 2008) of teaching practice, constructive feedback on pedagogical effectiveness (Moyles et al., 2002) could be provided.

Tertiary teachers should be scaffolded to progress their teaching qualifications from a certificate in adult and tertiary teaching Level 5, to a GDTE Level 7, dependent on previous qualifications and experience, rather than going directly into a Graduate Diploma Level 7 qualification, as for many this is a leap too far. As well as developing teaching skills by studying as a student, a teacher would experience a learner's perspective and thus become a more responsive and effective teacher.

It is important that educators are scaffolded into tertiary teaching, in manageable steps, using a supportive secondary teaching model and a constructivist approach of learning by doing and reflection, supported in a community of practice of like-minded, experienced educators (Henry et al., 2020) to bounce ideas off – rather than a traditional approach that represents outdated assumptions about the teacher's identity, ability and role.

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EXPERIENTIAL LEARNING: INVESTIGATING LECTURERS' PERCEPTIONS OF AUTHENTIC LEARNER ACTIVITIES

Bruno Balducci

INTRODUCTION

Experiential learning is promoted by Otago Polytechnic (OP) as the approach that is used for the delivery of its programmes. So how do lecturers view this approach? What does it mean to them in terms of how it affects their students' experience and their endeavours to teach them? To answer these questions, I interviewed a group of OP lecturers in a range of disciplines at tertiary level in order to gain an insight into their understanding of experiential learning in practice. In this article, I will analyse their perceptions with regard to the challenges and benefits of following an experiential approach in their practice.

There is no shortage of literature on the theory of experiential learning, as well as on its application in practical terms (see, for example, Kolb, 1984). The purpose of the approach is to foster "active learning" (Lewis & Williams, 1994) or "collaborative learning" (Barkley et al., 2014) through problem-solving (Warren, 1995; Wurdinger, 2005) in a relevant, student-centred context that will engage and motivate students (Wurdinger, 2005). Lewis and Williams (1994) make a distinction between field-based experiences (internships, practicums, etc.) and classroom-based learning (simulations, role-plays, etc.), where the latter can now also be applied to online or blended delivery. Relevance is a key factor in either case, which for our students must be linked to their vocational field of study.

The transferable skills or "learner capabilities" (Otago Polytechnic, 2021) that students develop through such activities are as much about the ability to function effectively in the world of work as they are about performing specific tasks with professional expertise. Of these skills, the most highly valued by employers are teamwork and interpersonal behaviour (Otago Polytechnic, 2021). Finally, experiential activities are also reflective: "Learners need the opportunity to reflect on, defend, and share what they have learned if it is to become part of their available repertoire" (Merrill, 2002, p. 51). In vocational education, reflective stages in an activity help students to be better prepared for dealing with the complexities of real life (Schön, 1983).

The focus of my research is not field-based but essentially classroom-based learning, though it does extend to field trips and other external events, as well as asynchronous online work by students. In accordance with the overview outlined above, a shared conception of the experiential approach was reached through one-to-one discussions with every participant in this study, in the context of a learner activity which they contributed to the resource bank described in the Methods section. In each case it was understood and agreed that learner activities:

- are hands-on
- relate to a context in the world of work
- require students to interact together
- allow them to reflect on their experience.

Special emphasis was placed on making student learning authentic and interactive. Authentic activities were defined as i) set in a specific work-related context and ii) resembling tasks that would normally be performed by professionals in that context. As for interactivity, this was taken to mean that learner activities can only be completed by having students talking and/or writing to each other, whether in pairs, in small groups or in larger teams. The importance of combining authentic and interactive features in the design of experiential learning was assumed to apply in equal measure to face-to-face and online classes. With the constant development of communication technology, getting students to interact as fully in a virtual environment as they would in a physical classroom is becoming increasingly feasible.

Perhaps what is more of an issue is the notion of an activity being 'authentic.' Some commentators have criticised this concept for its dependence on how the teacher interprets reality. Instead of a replication of what happens in real life, students are given an imaginative product which Petraglia (1998) called "the real world on a short leash" (p. 53). In response, Herrington and Reeves (2002) have compared students' engagement in these activities to the "suspension of disbelief" which audiences experience with movies. In activities that "simulate a real-life context for learning, a similar suspension of disbelief is required" (p. 3). The authors acknowledge that students who are unfamiliar with "authentic activities" often regard them as time-wasting, lacking in academic rigour and getting in the way of their learning. These students are not yet ready to suspend their disbelief in order to engage with the content of such activities. Once they do, they can get over their initial doubts and achieve "the cognitive engagement that higher order learning requires" (p. 8). They begin to appreciate how authenticity (and reflective practice) will help them to face the more unpredictable challenges of their future employment.

This article explores the different ways in which a number of OP lecturers perceive experiential learning in the context of their own teaching practice. It enquires into how they see the problems as well the advantages that are associated with this approach, both from the lecturer's and the student's point of view. Special attention is given to how these lecturers talk about such activities in terms of student engagement, practicality, authenticity in the world of work and interactivity, both in the classroom and online.

METHODS

This research into lecturers' perceptions took place in the context of a wider project to develop a resource bank of authentic activities for teaching staff at OP. Lecturers were invited to contribute their own activities for the resource bank, and semi-structured one-to-one interviews were recorded in which the participants were asked to clarify the nature of their activity. Of particular interest was the question of how it could be delivered online, as well as face-to-face, since the interviews took place during COVID-19 restrictions in 2021 and the lecturers were teaching online at the time.

In each interview, the researcher and the participant looked at one activity together in sufficient detail in order to establish common ground in their understanding of experiential learning, and to agree on a working definition (see Introduction). This procedure enabled the study to be partly framed within a constructivist paradigm where meaning is co-created and perceptions can be described in their subjectivity. Further questions were asked regarding what the participants considered to be the main challenges and benefits of experiential activities like the one discussed. Where challenges for the lecturer are concerned, the conversation was focused on perceived risks (for example, not achieving course aims) as well as barriers (for example, student reluctance to accept teaching methods they are not accustomed to).

A mixed-mode pragmatic approach was taken in order to provide both quantifiable data for identifying and comparing the more general views expressed, and qualitative data for a deeper understanding of experiential learning in practice. Answers to standard questions were coded and quantified, while the reasons given for these answers were also noted. The transcripts were then carefully studied for discourse analysis of their content in relation to student engagement and the four characteristics of experiential activities highlighted in the Introduction (hands-on, work-related, interactive and reflective). The data thus collected were organised

and examined through an explanatory sequential design where the results of quantitative research provide a platform for a discussion of more qualitative findings (Creswell, 2013). Ethical approval for this research was obtained from the AIC Ethics Committee.

FINDINGS

There were 18 participants in all, with equal numbers of male and female lecturers overall teaching applied management, construction, information technology and English. These lecturers identified a number of barriers to the implementation of experiential learning, including i) the complexity of their role and workload. As expected, a majority of participants (56 percent) indicated that they saw this as the main barrier, for reasons generally related to the time spent on designing and planning activities. One lecturer put the blame squarely on "lack of effort ... or lack of energy." Other reasons were about keeping up to date on current practices in industry or engaging students in authentic situations, where the time and effort involved are more implicit. Only one participant talked specifically about the delivery of activities, which may require the lecturer to deal with students' problems. At the same time, two further barriers were seen as significant, namely ii) the negative response of some students (due to their reluctance to participate, lack of learner training, teacher dependence, etc.) and iii) a tendency among students to focus exclusively on assessment. What the latter brings out in this context is the need for a seamless integration of experiential activities and assessment tasks.

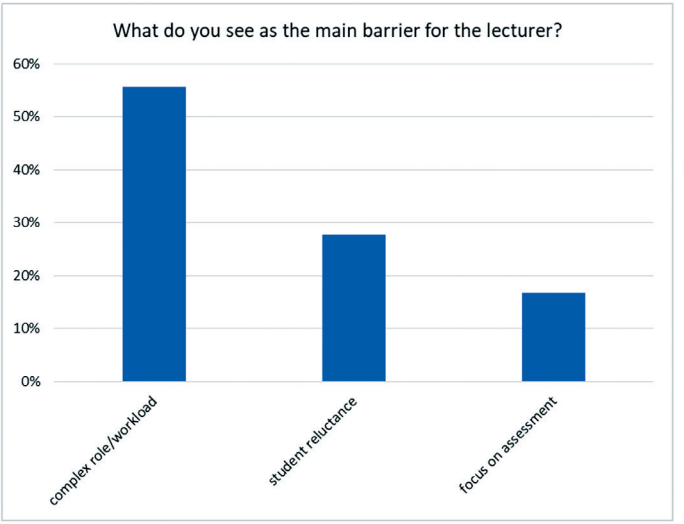

Figure 1. Challenges of experiential learning (1).

When asked about the biggest risk associated with teaching with experiential activities, participants thought of a wider range of factors. There is the risk that i) course objectives may not be achieved, which 50 percent of participants viewed as the most consequential. The reasons for this were also wide-ranging, from class management issues (misunderstood instructions, students' own time management, technical problems with equipment and resources) to considerations of planning that result in a mismatch of activity objectives to course outcomes. As one participant remarked, "We can't just use activities for the sake of using them, we really need to keep the objectives in mind." Other major risks were about students ii) going off-task/not engaging, iii) feeling they were wasting their time, or iv) losing their trust in the lecturer. The focus was more on negative student perceptions than on achieving course objectives, though the two are obviously connected.

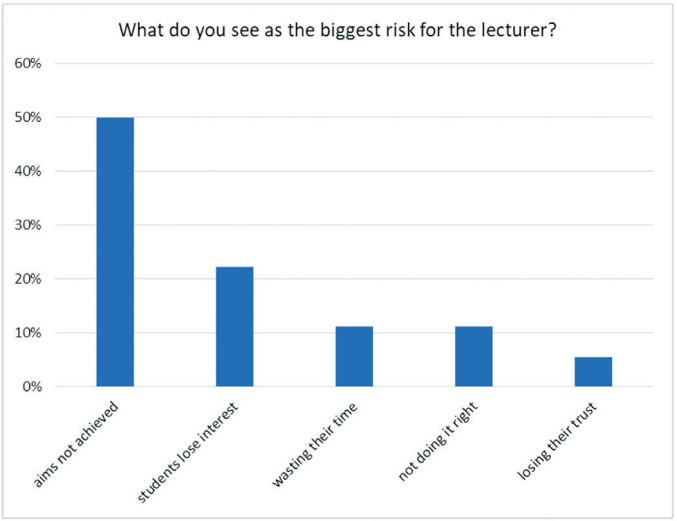

Figure 2. Challenges of experiential learning (2).

As for the main benefit of experiential activities for the lecturer, a variety of responses emerged, with i) enhanced student motivation as the most significant among them (44 percent of answers given). This was largely for reasons of enjoyment (positive atmosphere, creative lessons) or practicality (usefulness/relevance of hands-on tasks). It is worth noting here that only two lecturers mentioned student-to-student interaction. Next in order of importance were ii) alignment with course aims and iii) more in-depth learning, where work-related skills and collaboration were the most frequently mentioned reasons for these benefits. In other words, group work and authenticity are definitely valued by the participants, although this may not necessarily involve a great deal of communication between students. It is possible for some of the more technical activities to be completed by students working alongside each other rather than interacting effectively as a team.

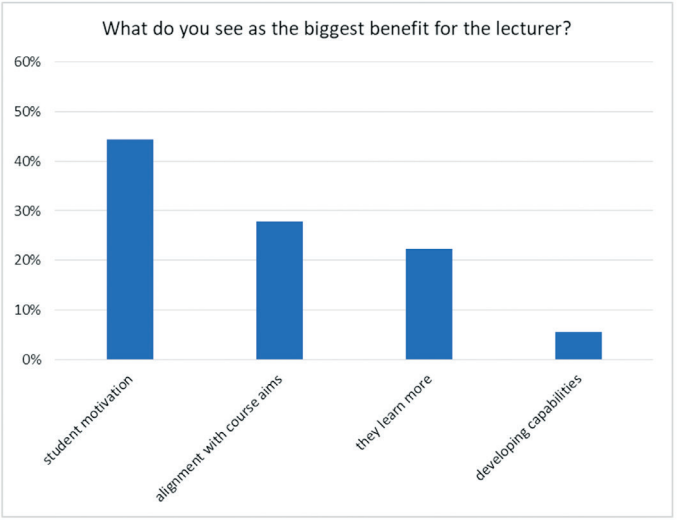

Figure 3. Benefits of experiential learning (1).

So, what about the main challenge from the students' point of view? The answers to this question did not produce any clear-cut results. For a relatively small proportion of lecturers, a major difficulty was that i) students sometimes lack experience of this approach to teaching and learning (28 percent). The reason for this, according to one lecturer, was that some students are not used to communicating with people from different cultures. Another answer given was that ii) non-native speakers struggle with using English in real-world tasks, which according to a few participants can lead to a breakdown in communication. This is different from iii) students not knowing how to complete an activity, where the lack of confidence has more to do with problem-solving skills than language. A not unexpected answer was that iv) unfair distributions of the workload can occur in different groups, one reason being that highly motivated students end up with less motivated ones.

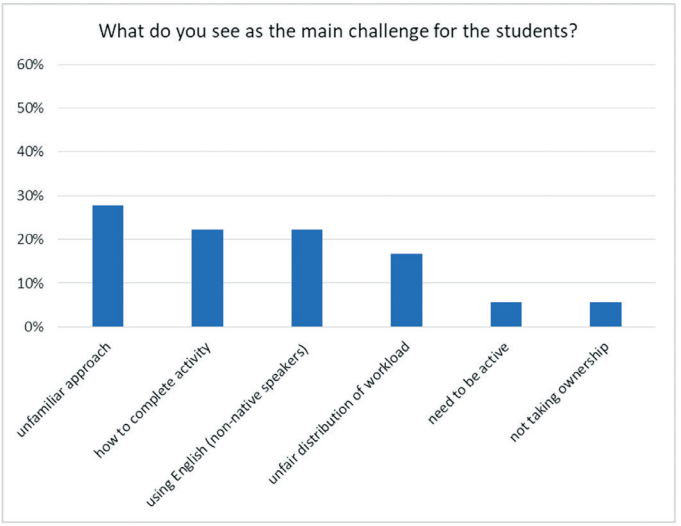

Figure 4. Challenges of experiential learning (3).

As with the challenges for students, there was not much consensus between the participants about what their students gain from learning experientially. Some believed the main benefit was i) how it affects their motivation (33 percent), which half of these participants accounted for in terms of students appreciating the relevance of their learning, and one saw more as a consequence of the enjoyment they get from communicating with each other. The remaining commonly held views were to do with ii) a clearer focus on course aims on the part of students or iii) generally productive lessons. Once again, motivating students and achieving course aims are recognised as key benefits of experiential learning. The close association between these two factors becomes all the more evident in the way most participants explained the latter – in other words, as dependent on its relevance to the world of work.

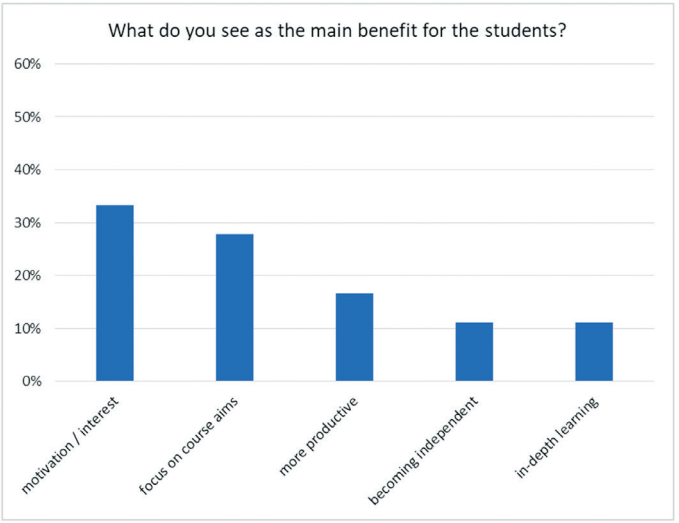

Figure 5. Benefits of experiential learning (2).

Overall, lecturers were generally confident about their awareness of experiential learning at a theoretical level and also in practice. They were able to discuss its challenges and benefits with reference to their own classes and consider their students' perspectives in some depth, as well as that of the lecturer. What these findings do not reveal is the extent to which the approach is actually applied in their teaching. But their perceptions can be compared to other studies, notably Wurdinger and Allison (2017) who conducted a survey of 295 university academics in different disciplines. When asked about the main obstacle to implementing experiential learning, "sixty-one percent said not enough time" (p. 33). This figure is not far from the 56 percent of OP lecturers interviewed who gave the same answer. Wurdinger and Allison also found that 17 percent of participants blamed assessment procedures, which is identical to the percentage in this study.

The risks of an experiential approach, meanwhile, are more difficult to evaluate. A conference paper on risk in higher education (Solanas et al., 2016) reports that academic literature has little to say "regarding the teachers' own perception and experience of risk and risk taking when designing and implementing innovative practices" (p. 7178). While these authors were asking about innovation in general, it is nevertheless clear that "experiential learning, role play and simulations" (p. 7180) featured prominently in their research. Based on views expressed by lecturers with a range of specialisms, their work is entirely qualitative, but it allows them to assert that the lecturers involved "feared the consequences of innovation on their personal life, their professional career and, above everything else, on student learning" (p. 7184). Similarly, at least half of the participants in my study worried about the effect that an experiential approach might have on the achievement of their course aims.

The views expressed by lecturers give a broad account of their perception of experiential learning. For more specific insights into their understanding of this approach, the transcripts can be analysed for their linguistic content. What this shows, first and foremost, is a much greater preoccupation with authenticity and engagement than with practicality, interaction or reflection. The word 'real' was often used to describe learner activities. Typical examples from different lecturers include:

> "We're attempting to mirror or reflect what real life is going to be like."
>
> "We want to create a more active, engaging environment, to replicate a real working environment."
>
> "One thing I like to do when I'm preparing these activities is to link them to something that's real."

> "So, what you want to do is create a scenario or create a context which is real for them [the students]."

Another aspect that tended to be stressed is the 'work-related' or 'work-based' character of this type of learning in practice, as in the reference to "a real working environment." Other instances of this are:

> "Now, what's the skills they've learned? In terms of workplace development."
>
> "Can I use it in my personal life? Can I use it in my … at work?"
>
> "But then the application, putting that through to the business world is often hard work."

The predominant view to emerge from the transcripts is that experiential learning is 'real,' as opposed to purely academic, and offers a context for skills development that is much closer to the world of work. Student engagement also came up quite frequently, sometimes in conjunction with authenticity, as already seen in the comment about the need for an "active, engaging environment, to replicate a real working environment." The link between engagement and experiential learning was even more explicit in some cases; for instance: "It makes students more engaged." This lecturer ascribed the students' engagement to the variety of activities that become possible through the experiential approach. For another participant, students need to be fully engaged for activities to work at all. Several reported that students are clearly motivated by authentic activities, while others expressed concern and even disappointment at the lack of participation they encountered at times. So the level of engagement involved, whether positive or negative, was a main point of discussion during interviews.

The concept of interactivity, on the other hand, was relatively underused, despite the relevance of communication skills in vocational education. Not only were teamwork and interpersonal behaviour the most highly-rated skills in OP's survey of employers, but verbal communication came next in their ranking of learner capabilities (Otago Polytechnic, 2021). Preparing students effectively for the workplace, in other words, depends as much on giving them opportunities to communicate with each other as making the focus of their work as real and lifelike as possible. However, some lecturers did emphasise the value of students talking to each other or learning from each other (presumably through communication in groups).

As with engagement, they also felt that lack of interaction was a significant problem. Take, for instance: "They don't interact. [That's what] students do when they are not comfortable in the group." One participant described having to intervene: "I explained to them that it's important to interact and if you are having any issues you [should be] coming up with those issues rather than just sitting back." Another saw technology as the cause of such situations: "I think that's the biggest issue, getting them to truly communicate with each other when they're in front of a screen so the whole context seems a bit detached and cold."

In my discussions with lecturers, the most neglected aspect of experiential learning was reflection and critical thinking. Only a few of the participants acknowledged the role that it plays in learner activities:

> "And then they're reflecting on what they have completed."
>
> "It also will help students' own learning autonomy, because … they reflect on things."
>
> "And then they're reflecting on what they have completed. They're learning from each other, reflecting on their own practices. So this gives them an opportunity to talk a lot."

The first of these speakers was also conscious of the need for effective time management to ensure that students are able to complete the more hands-on phase of the learning process, without which there can be no meaningful reflection. The other two, meanwhile, made interesting connections with learner autonomy and interaction between students.

DISCUSSION AND CONCLUSION

The lecturers in the study chose to prioritise the authentic nature of experiential learning in their thoughts about its benefits and challenges. This was generally understood to differentiate such activities from a more academic approach, where student participation is greatly reduced and learning processes are assumed to be more passive. References were also made to the practical, interactive and reflective aspects of experiential learning, usually in the context of group work. Judging from the data gathered in these interviews, there was a shared belief in collaborative learning among the participants.

The concept of collaboration is implicit in the working definition of experiential learning established in each interview (in other words, students are required to interact with each other). It is presented as an integral part of authentic activities in the literature on this topic, notably in the work of Herrington, Oliver and Reeves, who have devised a well-known set of characteristics for their design. They describe collaboration as "integral to the task, both within the course and the real world, rather than achievable by an individual learner" (Reeves et al., 2002, p. 564). It is worth pointing out that these authors are concerned with online learning.

Also in the context of higher education online, Parker equates collaboration with communication when observing: "Many researchers believe that authentic tasks supported by the affordances of new technologies that enable people to communicate and collaborate have the potential to improve student engagement and knowledge construction" (2011, p. 4). Effective collaboration rests on effective communication – hence the phrase "communicate and collaborate" doesn't really work when inverted. In short, (online) collaboration depends on "appropriate tasks and communication" (Herrington, 2006, p. 3).

Participants thought primarily about the appropriateness of their tasks, which involved teamwork and the use of technology. They intended their teaching to be relevant to the workplace. In some cases, the collaboration they described was not unlike the way it would happen in the real world. But for such activities to be fully authentic, particular attention needs to be paid to the way that people in these situations would normally communicate. This requires more than simply providing communication technology or setting up "appropriate means of communication" (Herrington, 2006, p. 3). If students are to develop the learner capabilities or soft skills that employers are looking for, they need structured practice in how to communicate effectively and this should be built into the design of learner activities.

As indicated above, collaboration can sometimes take place without full communication between students, who may be working independently within their team in order to achieve a common goal. A lecturer explained the problem while recalling a dysfunctional group: "It's not that they were not doing their work, but they were not interacting, which they should have been, given that they were put into groups to be able to brainstorm." The students were engaging with the task but not with each other.

A number of other lecturers talked about similar situations, which they ascribed to various factors including shyness and lack of motivation. In some cases, the tasks are not even completed and objectives are not met as a result. In the words of one participant: "They don't interact, they don't do the activity and they don't learn." A more familiar scenario is one where the students' contributions are not equal, or as another lecturer put it, "one person doing all the work and other students getting the benefit." Wurdinger and Allison (2017) encountered this issue in their survey, which they portrayed as "not collaborative learning, but a common misrepresentation of the technique" (p. 36).

Inevitably, students do not get as much out of activities if they will not collaborate, and this in turn reduces the benefits of debriefs and reflective stages. Ninety-two percent of faculty academics in Wurdinger and Allison's survey said that critical thinking is enhanced through experiential learning – the highest percentage, closely followed by problem solving and communication skills (2017, p. 34). Reflection enables students to deepen their understanding, retain learning and develop thinking skills. But to have meaningful reflection through an

experiential approach, they first need a contextualised, authentic activity (Herrington, 2006). This means that without communicative collaboration during activities, their skills development in other parts of the course will also be affected. As one of the participants remarked in their interview, "How do you do the debrief, if they don't participate?"

In this study, I have presented and discussed both quantitative and qualitative data drawn from a project on the use of experiential activities by 18 lecturers at OP. While the sample size does not allow for generalisations, this research has enabled key concepts of experiential learning to be explored. Of particular significance were findings relating to authenticity and student interaction, where a lack of effective and naturalistic communication between students can have a serious impact on their development. Or to put it simply, there is a lot more to experiential learning than work-related activities.

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COLLAGE AND CRITICAL THINKING: WHAT THE POP ARTISTS TAUGHT ME ABOUT DOING SOCIOLOGY

Natalie Smith

INTRODUCTION

Drawing on David Kolb's Experiential Learning Cycle (ELC), I reflect here on how my experiences as an art history and theory teacher led me to consider collaging as a heuristic device for small groups of sociology learners. Since 2014, I have worked as a teaching fellow in Sociology, Gender Studies and Criminology (SGSC), University of Otago, where I support teaching into three large first-year sociology (SOCI) papers. My background is in art history and theory, with a special interest in the social foundations of art. From 2018–2020 I was seconded to lecture in Art History and Visual Culture (ARTV), University of Otago. During this time, I taught a pop art paper and introduced students to collaging through an assessment.

Teaching simultaneously in ARTV and SOCI led me to critically reflect on my experiences as an art history and theory teacher, and to consider how I could use these experiences to enhance first-year teaching and learning in sociology. In my teaching, I observed that ARTV learners were better able to understand and apply theoretical concepts because they could visualise them. Despite the growth of visual sociology (Becker, 1995; Harper, 1988; Grady, 1996; Pink, 2012), sociology continues to be perceived as a "discipline of words" (Winddance Twine, 2016, p. 967). There is, however, a disjunction between the ability to read words on paper and our "frames of reference" – the signs, symbols and language which are the foundations for our thoughts, feelings and assumptions (Mezirow, 2010, p. 21). Seeing, or organising data through our eyes, involves frames of reference which we then use to explain the world around us. As John Berger famously noted, "Seeing comes before words" (Berger, 1977, p. 7).

As part of my sociology teaching, I run a range of supplementary support tutorials across the first year, working with college halls and on-campus indigenous groups, as well as holding extensive one-to-one consultation sessions with a broad range of learners, including those who identify as neurodiverse and older, or returning, learners. It is within the context of these smaller supplementary tutorials and one-to-one consultation sessions that I trialed collaging as a tool to help students understand key concepts in sociology – notably intersectionality, a theoretical framework developed by Kimberlé Crenshaw. Crenshaw posits that individuals can have overlapping experiences of privilege and/or discrimination, which are fluid and context-dependent (Crenshaw, 1989).

Developed by John Dewey in 1938, the concept of experiential learning has undergone various iterations. At its core it foregrounds direct experience and engagement with the processes of that experience: learning by doing (Dewey, 1938, cited in Kolb, 2015, p. 5). Laboratory work; field trips and projects; studio-based learning such as that which occurs in art and design education; internships and apprenticeships all constitute forms of experiential learning (Kolb, 2015). The Experiential Learning Cycle was adapted by David Kolb from the Lewinian Experiential Learning Model (Kolb, 2015, pp. 32, 51; Gibbs, 1988, p. 1). The ELC is a "process whereby knowledge is created through the transformation of experience." Stage 1 of the ELC involves experience, stage 2 reflection, stage 3 conceptualisation and stage 4 experimentation (Kolb, 2015, pp. 49–51).

My experiences in ARTV led me to reflect on my teaching experiences in SOCI, and through this reflection I began to conceptualise new tools for teaching, which I then experimented with in supplementary tutorials and one-to-one meetings with learners. Critical reflection is pivotal to transformation; as Graham Gibbs notes, "it is not sufficient simply to have an experience in order to learn. Without reflecting upon this experience it may quickly be forgotten or its learning potential lost" (Gibbs, 1988, p. 1). The affective dimension of reflection can lead to new ideas and concepts which can be deployed to develop new initiatives and approaches (Gibbs, 1988).

COLLAGING AS AN ART HISTORY ASSESSMENT

Collage, the process of cutting and pasting material onto a flat surface, originates from the French verb *coller,* which translates as "to stick" (Butler-Kisber, 2017, p. 2). In Pop Art, Fashion and Consumer Culture, a 200/300-level paper that I designed, I set a collage as the first assignment. The assessment is introduced in the first tutorial, which takes place at the Hocken Collections/Uare Taoka o Hākena, University of Otago. Staff at the Hocken set aside source material, magazines and ephemera from the 1950s and 1960s for the exercise. The assessment is based on an article by John-Paul Stonard (2007) which explores the process and meaning behind Richard Hamilton's collage, *Just what is it that makes today's homes so different, so appealing?* (1956).

The instructions are as follows:

1. Using the resources from the Hocken Collections create a collage which, like Hamilton's *Just what it is that makes todays home's so different, so appealing?* (1956), represents the zeitgeist (spirit of the time). You can use a camera to capture the images or have photocopies made by Hocken staff. [There was no cutting of archival material.]
2. Please ensure you take note of where the images were sourced from, you will need to reference them in your commentary.
3. The collage should be presented on A3 paper and should only use techniques available at the time, i.e., no photoshopping, but you can draw and paint on the collage. The collage will be assessed on the following criteria:
    a. The collage is visually coherent and reflects a theme, for instance you may want to focus on homes or interiors like Hamilton, or you may choose to focus on fashion, the automobile, gender, or outer space.
    b. Your collage has a title which appropriately reflects its theme.
    c. The material used is from a specific and coherent timeframe, i.e., 1955 to 1957, not 1951 and 1964.
    d. At least FOUR images/or pieces of text are used.
    e. If text is used, the text must be relevant to the period.
    f. A 600-word [1,000 words for 300-level] commentary is submitted with the collage. This commentary should reflect on the sources used, and explain why you chose the material you did, i.e., what is it about the images you have chosen which speak of the time? Stonard's essay provides a template for how to do this.
    g. All sources must be correctly referenced.

The goals of the assessment are to enable learners to:

1. Experience and reflect on a technique deployed by pop artists: collage (stage 1 of the ELC).
2. Understand that "an image in Pop Art is in a new context" (Alloway, cited in Lippard, 1966, p. 27) (stages 1 and 2 of the ELC).
3. Develop an understanding of the twentieth century as the American century, focusing on the 1950s and 1960s (stage 3 of the ELC).
4. Contextualise the themes explored by pop artists, such as the gendered representation of consumer goods (stages 2 and 3 of the ELC).

The process of learners looking at material from the historical period under discussion and reframing what they see is transformative (stage 4 of the ELC). The collage is the first piece of assessment in ARTV and serves as a scaffold for the other two pieces of written assessment: an essay plan and a research essay. Students who produce a collage on an aspect of gender, for example, will go on to write a research essay on this topic. In

grading learners' research essays, I felt that their collaging work had enabled them to engage with their research topic on a deeper level because the re-arranging of material had facilitated new ways of thinking.

University of Otago teaching evaluations, where students have the opportunity to anonymously comment on course materials and teaching methods, were used to gauge the effectiveness of the collage assessment. Feedback from the ARTV learners was positive. One survey respondent noted: "The assessments (especially the collage) are very fun yet critical." Learning as fun is a common theme in the feedback: "It was very helpful in focusing knowledge and [the] mind on [a] particular era, was fun to look at old advertisements and getting a good idea of that time in history." Other learners indicated that the collage helped them understand the "techniques the artists use" and was a "really effective research tool." Learners also provided feedback that helped refine the assessment; for instance, they asked for examples, and for the size of the collage to increase from an A4 presentation to an A3 format. With learners' permission, I exhibited their work outside my office. The learners enjoyed seeing what their peers did and it helped them consider other elements of representation.

REFLECTING ON COLLAGING AS A TOOL TO FACILITATE THE SOCIOLOGICAL IMAGINATION

As I neared the end of my secondment to ARTV, I reflected on collaging as a learning tool and the potential for using this technique in first-year sociology teaching.

Collaging motivated ARTV learners to engage in-depth with the course material. Motivation is the fifth obstacle to learning, as identified by Middendorf and Pace in their "Decoding the Disciplines: Seven Steps to Overcome Obstacles to Learning" diagram (2004, p. 3). One obstacle to learning that I have observed in sociology is motivating learners to read and engage with scholarship beyond the memorisation of concepts – a surface approach (Ramsden, 2003). To facilitate transformative learning and ignite the sociological imagination, learners should be able to apply what they read to everyday conversations and assessments. C. Wright Mills's notion of the sociological imagination – the argument that to gain deeper insights into our personal troubles we need to understand the relationship between our own lives and larger social issues, as well as historical patterns (Mills, 1959) – is the key threshold concept in sociology (Thomas, 2020).

Considering stage 5 of Middendorf and Pace's (2004) obstacles to learning cycle, I believe that the affective factors inhibiting reading and engagement among sociology learners are twofold. One, the emphasis on reading does not correlate with how we see the world. Two, the difference between a growth and a fixed mindset is critical: a person with the former embraces challenges such as a difficult reading, whereas a person with the latter can give up if the task is too hard (Dweck, 2016). For me, the comment from an ARTV learner that collage was "fun yet critical" sums up what good teaching should be about. It should engage learners in ways that are relevant to them, shift mindsets and be transformative.

Sociology's emphasis on words implies that to do sociology a student needs to master complex definitions in written text. Privileging words over images is a bottleneck that blocks transformative learning (Middendorf & Pace, 2004, p. 3), as this approach does not align with how learners experience the world. Learners tell me that they understand better by "doing," and some attend consultation hours with elaborate essay-planning mind maps of images and drawings that demonstrate their understanding and application of the theories presented in lectures and discussed in the regular class tutorials.

In reflecting on SOCI learners, the material they would bring to consultation hours, and the comments about learning that they would make in supplementary tutorials, I began to see parallels between learners' experiences of engaging with material and the process of collaging used in ARTV. Collaging is an experiential approach to research that aids learners in unpacking concepts (Butler-Kisber, 2010). Through the process of cutting, pasting and moving material around, collaging enables "making thoughts complex, facilitating the thinking, writing and talking about the inquiry" (Butler-Kisber, 2017, p. 2).

Possessing a sociological imagination is transformative. For transformation to occur, however, learners need to see things anew, to alter their "frames of reference" (Mezirow, 2010, p. 21). Jennifer Garvey Berger argues that "without new lenses through which to view new possibilities, question old assumptions, and so on – it is unlikely to lead to new actions" (Garvey Berger, 2004, p. 337). In acknowledging the transformative nature of the sociological imagination, Thomas also notes that it "can also be *troublesome* for learners and they may spend a considerable time in an uncomfortable *liminal state* as they struggle to grasp it" (Thomas, 2020, p. 114).

I believe that the "*troublesome[ness]*" and "*liminal state*" identified by Thomas arise because learners believe that to understand sociology they need to master difficult theories, like intersectionality, through reading words on paper. This belief is at odds with the 'seeing' metaphors that populate course material, as well as with Mills's references to vision as the key to unlocking the sociological imagination (Mills, 1959).

The emphasis on writing skills embedded into the traditional assessment structure signals that writing is the key to mastering the discipline, igniting the sociological imagination and developing the critical skills that mark out a sociologist. Mary Moynihan argues that essay-type assessments in sociology imply that there is "an affinity between the concept of writing as a tool of learning and C. Wright Mills's concern with the sociological imagination" (Moynihan, 1989, p. 346, cited in Delaney et al., 1995, p. 354). Yet, as noted, the sociological imagination foregrounds the visual (Mills, 1959). Delaney et al. (1995, p. 354) describe pure writing and research assessment methods as "recipes without ingredients." These assessments may make learners write better, but do not teach them how to think like a sociologist. Rather, such assessments suggest that a sociologist looks like someone who has competence in the vocabulary (Delaney et al., 1995). Learners can easily *define* a concept taken from a textbook, but often do not really *understand* it: a surface approach to learning (Thomas, 2020).

I have used the Essay Burger model (Roundtaiwanround, n.d.) to help learners understand the writing process, but this can lead to an overemphasis on meeting the technical requirements of an essay rather than attention to the "ingredients" (Delaney et al., 1995, p. 354). When shown the Essay Burger, learners typically ask me, "How many paragraphs should I have? The burger has three." Further, the burger model follows the traditional linear method of writing, positing writing as a formula that involves layers which can be easily assembled. Writing, in contrast, is "messy" and a "craft" (Cameron et al., 2009, p. 270).

The notion of writing as a craft foregrounds process rather than product. Learners will often ask if we have a template, a product that they can look at to replicate. The Essay Burger is the closest thing to a template we provide, due to concerns that examples of former learners' work will lead to duplications of that work, rather than a direct original engagement with material, thus undermining learner development. An emphasis on process rather than product has parallels in design education. In this discipline, emphasising the process as messy and non-linear removes any "naïve belief that there is a simple sequence from working drawings to final product: [students] realise how messy the real process of design is" (Ramsden, 2003, p. 165). While Cameron et al. (2009) focus on academic and postgraduate writing, their observations correspond with my reflections on the writing experiences of undergraduate learners, where difficulty grasping the process of writing can, as the authors note, "erode the confidence" of writers (2009, p. 269).

FROM POP ART TO SOCIOLOGY

Reflecting on the difficulties of teaching writing, the concept of intersectionality and catering to growing student diversity in first-year sociology led me back to the world of the pop artists. Pop artists were interested in exploring their lived environment, and the overlapping elements of the collage process replicated this: "Thus, artists were revealing a sense of the city as … a symbol-thick scene, criss-crossed with the tracks of human activity" (Alloway, 1966, p. 40). These artists were interested in how individuals mediated their own identity in a shared visual culture, deciphering the signs and symbols of everyday life, and turned to sociology, anthropology and the mass observation movement as sources of inspiration and theoretical frameworks (Spencer, 2012).

Like the pop artists of the 1960s, learners in sociology are also interested in exploring their own experiences (Thomas, 2020; Delaney et al., 1995). In thinking about the challenges of transferring techniques from SOCI to ARTV, I came across the musings of Kay Mars: "Can we teach about intersectional theory, without taking into account the intersectional lives and lived realities of ourselves and those who are engaging in our classes?" (Mars, 2020, n. p.). Here Mars is highlighting the difference between intersectionality as a theory, a tool for learning, and teaching intersectionally – that is, recognising the diversity of the student cohort. "Teaching intersectionally … means adjusting your teaching – regardless of the content – to the imaginaries and life worlds of learners, so that what is being taught becomes recognizable and meaningful to them" (Mars, 2020, n. p.).

I suggest that this can be achieved through collaging, a process that enables learners to visualise and experience the complexity of intersectionality through the process of moving material from one context to another, in a way that makes sense to them. Collage assessments also scaffold writing (Butler-Kisber, 2017, p. 2).

Janet Stewart argues that to comprehend complex terms like globalisation, an invisible idea "couched in terms such as 'flows', 'globalizing forces', and 'surface appearances," alternative modes of "knowledge construction" are required (2012, p. 368). Drawing on the work of Michael Harris, she argues that art makes visible complex theory, ideas we cannot see, thus "potentially offering a transformative function" (Harris, 2006, p. 213, cited in Stewart, 2012, p. 369). Stewart analyses Ursula Biermann's film *Black Sea Files* (2005) which uses fade-ins, camera pans and close-ups to highlight the scale of globalisation. In one scene, for example, Biermann juxtaposes massive oil storage tanks with the small figure of an individual (Stewart, 2012). It would be difficult to ask first-year students to master the techniques of film to explore theory, but a collage assessment has potential because it is easy to do.

Collage is non-linear and thus replicates how we see, and it can accommodate diverse perspectives: "[C]ollage reflects the very way we see the world with objects being given meaning not from something within themselves, but rather through the way we perceive how they stand in relationship to one another" (Robertson, 2000, p. 2, cited in Butler-Kisber, 2017, p. 3). Robertson's reference to understanding relationships between things alludes to the potential for collaging to be used as a pedagogical tool for intersectionality because of the way that an object or symbol changes meaning in different contexts. As pop artist Edouardo Paolozzi argues:

> Symbols can be integrated in different ways. The watch as a calculating machine or jewel, a door as a panel or an art object, the skull as a death symbol in the west, or symbol for the moon in the east, camera as luxury or necessity. (Paolozzi, 1958, cited in Lippard, 1966, p. 35)

One difficulty in teaching intersectionality to sociology learners is getting them to understand that individuals may experience privilege in one context, but not in another. The non-linear approach of collaging imitates intersectionality. Collage, "like concept maps, has the advantage of producing a web of connections instead of linear ones. At the same time … the joining of disparate fragments can produce associations and connections that bring unconscious thoughts to the surface" (Butler-Kisber, 2017, p. 4). These webs of connection mirror intersectionality and through odd associations, "frames of reference" (Mezirow, 2010, p. 21) can be altered.

Popularised by the European avant-garde and the pop artists, collaging can include visual material, artefacts such as pieces of fabric, and written text; it offers learners an alternative way of synthesising material that moves away from the traditional linear model of writing and organising material; and as this shift occurs new meanings can be created (Sanchez, 1999). In this process, the "tacit, or what has remained unconscious, bubbles to the surface" (Butler-Kisber, 2017, p. 4). The laying bare of tacit knowledge through the process of collaging opens the door for new ways of seeing; what Mannay calls "making the familiar strange" (Mannay, 2010, p. 91), a key precept in sociology (Garfinkel, 1967, cited in Scott, 2015, p. 1).

COLLAGING DIVERSE PERSPECTIVES

Reflecting on collaging within pre-service teacher training, Donna McDermott has spoken of the transformative potential of this process, enabling the diversity of learners' experiences to be revealed, re-emphasising a student-centered approach to teaching and encouraging learners to find new links and question old ideas (McDermott, 2002, p. 65) Similarly, Felice Yuen used collage for a participatory action research project that explored the "meaning of healing with Aboriginal women and the meaning of leisure in their experiences of healing" (Yuen, 2016, p. 338). Yuen deployed collage to shift away from "binary" forms of knowledge construction towards fluid interpretations in order to honor "indigenous forms of knowing" (Yuen, 2016, p. 339). Elena Vacchelli has employed collaging to collect data from migrant women about their experiences of migration and access to mental health. This methodology allowed different stories and subject positions to be foregrounded and gave the women control over how their experiences were represented (Vacchelli, 2018). In addition, Chiara Bacigalupa has used collaging as a method of communication between parents and teachers within a university-based child care centre. She found it led to deeper understandings of the relationship between child development and play and resulted in better parent/teacher communication (Bacigalupa, 2016).

UNDERSTANDING INTERSECTIONALITY THROUGH CUTTING AND PASTING

Grasping intersectionality is crucial to igniting the sociological imagination and understanding the differences and divisions between race, class and gender within Aotearoa New Zealand, a core objective of one of the first-year papers I teach into. For the essay topic in this paper, learners are asked to pick two social divisions and analyse the cross-cutting intersections between either race/class, race/gender or gender/ethnicity.

Intersectionality is a notoriously difficult concept to grasp. However, in supplementary tutorials and office consultations, I introduced learners who were struggling to conceptualise material to collaging. This was done organically, and where I could see students having difficulty putting words on paper I showed them how they could collage their ideas in order to see things differently. Through this process, which involves a deliberate consideration and placement of material in a new context, learners became active participants in mapping intersections and thus became engaged in a deep learning process. As I worked with these students, I observed how the process of collaging (stage 1 ELC) was enabling them to develop deeper understandings of cross-cutting intersections (stage 2 ELC), thus allowing them to think about what they knew in different ways (stage 3 ELC) and to draw new conclusions (stage 4 ELC).

Ramsden (2003) distinguishes between deep and surface learning approaches. A surface approach is manifest through memorisation, whereas deep approaches focus on what learners know and seek to extend this knowledge through the application of theory to experience (Ramsden, 2003, p. 47). The deep approach, stage 4 of the ELC, is transformative, opening "a window through which aspects of reality become visible and more intelligible" (Entwistle & Martin, 1984, cited in Ramsden, 2003, p. 47).

Surface approaches focus only on meeting the requirements of the assessment (Ramsden, 2003). As Burmark (2008), Winddance Twine (2016) and Jordaan & Jordaan (2013) have argued, deeper learning occurs when we combine seeing with speaking and writing. While working with SOCI learners I observed that collaging enabled them to visualise concepts, reflect out loud on their own social locations and develop stories which they could then fashion into a thesis statement for their research essay. Collaging not only aided these learners in developing a deeper understanding of theory, but it helped them engage with writing in a non-linear and intuitive way (Butler-Kisber, 2010). Perceiving the writing process as linear can hinder the transfer of ideas to paper (Cameron et al., 2009). Several of the students I worked with in supplementary tutorials tell me that they now use collaging to plan out all their essays.

CONCLUSION

As the literature on the use of collage in teaching suggests, this form of assessment helps learners visualise concepts and accommodates diverse perspectives, features which would work well for sociology papers where learners often like to explore their own experiences. Enabling learners to visualise their essay through the process of collaging gives them more autonomy in constructing and developing their own knowledge – a key facet of transformative learning (Biggs & Tang, 2011, p. 100) – thus acknowledging a familiar teaching experience in sociology that "learners themselves often experience their first exposure to the discipline as transformative, with many referring to it 'opening their eyes' or 'broadening their perspective"' (Thomas, 2020, p. 114). Collage assessments also "level the playing field" for learners, some of whom are not well prepared for first-year study at university (Middendorf & Pace, 2004, p. 3).

While I have so far deployed collaging only in smaller support tutorials and one-to-one office hours, there is potential to extend this approach to the wider student cohort, as what the learners in these informal groups were able to do was realise our lives as more than one-dimensional experiences. Collaging enabled them to imagine the moving and shifting forces that shape our existence.

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DECISION SUPPORT SYSTEM DESIGN: REFLECTIONS ON TEACHING DECISION THEORY AND STATISTICS WITHIN AN INFORMATION TECHNOLOGY DEGREE

John Mumford

INTRODUCTION

Institutes of technology focus on vocational education and training. Application and qualification in computing degree courses aim to develop technical and academic skills for further study and employment. Information Technology (IT) is concerned with capturing, creating, storing, and manipulating data to generate useful information for businesses. The systems that are widely used to support decision-makers are known as Decision Support Systems (DSS). Since the development and widespread application of complex, global IT systems, data are plentiful. However, the challenges involved in harnessing data to support decisions are not trivial. The prevalence of Big Data presents substantial challenges to analysts due to its volume, velocity, variety, and variability (Naeem et al., 2022).

The value of data analysis, modelling and using the outputs from models to generate Business Intelligence (BI) forms a crucial part of IT teaching at the Southern Institute of Technology (SIT). The demand for skilled and experienced data analysts and business intelligence specialists is strong and likely to be sustained for the foreseeable future (Schroeder, 2021). However, there is value in educating information technology students to use smaller and simpler data sets, and to develop thinking about Decision Theory (DT) and statistics on the pathway to Big Data (Choi, 2019). Decision theory concepts are essential to educate IT students in decision support systems and include aspects such as decision type, risks, probabilities of decision outcomes and the underlying assumptions about how decisions are made. Decision support systems form part of the content of an elective final-year Bachelor's degree course in Information Systems for Management (ISM) at SIT.

This article reflects on how effective the explicit application of critical thinking is when connecting subject theory to practice, during an assessment task in which students design a decision support system based on a small data set.

The assessment task involved the student and teacher engaging with a simple business scenario, where client data ranging from age and estimated annual income, to employment category and reported gender, had been collected by a questionnaire and input into an Excel spreadsheet. The data was already organised into appropriate variables; for example, client age as measured data and employment category as nominal data. The teacher completed a walkthrough of each formative assessment sub-task, ranging from selecting variables of interest to analyse, generating numerical and graphical output, and evaluation of the models produced for validity. Summative tasks, in this context, are assessments where student performance is graded and contributes to the student's final mark. However, formative tasks aim to develop the student's academic performance, without the high stakes of a summative assessment. Thus, this formative task, which forms the basis of the reflective research which follows, is a trial run for the student, since it is based on a very similar scenario, but with a different data set.

First, the context and content of the reflection are outlined. Second, the need to prepare students to think critically for decision support system design is outlined. Third, the theoretical concepts of decision theory are navigated. Fourth, the challenges involved in teaching statistics to IT students are described. Finally, the conclusion reflects on the effectiveness of integrating statistics, decision theory and critical thinking for the students' future work readiness.

CONTEXT AND CONTENT

In the context of IT education at degree level, real-life challenges include computational thinking which, as a core skill, is more than just following or coding an algorithm. Doleck et al. (2017, p. 4) identify five computational thinking competencies: algorithmic thinking, cooperativity, creativity, critical thinking, and problem solving. It would be possible, but not desirable, to teach decision theory in isolation from decision support systems and its problem-solving aspect – but why not explore decision theory during ISM systems studies and support both present and future benefits for our students? We need students who are informed by decision theory and use decision support systems to solve problems and support effective decision-making. Such decisions may have potential for creating benefits for businesses. In this context, a DSS can be defined as "a computerised system that gathers data from identified sources, synthesises it, and makes it available to users in accordance with specified decision processes to support quality decision making on specific semi-structured and unstructured decision problems" (Sivapalan et al., 2020, p. 16). This article outlines the teaching strategies forming the basis for a series of lessons on decision support systems, students' responses, teacher reflections and ways of connecting, critiquing, and applying decision theory within the context of an ISM course.

PREPARING THE FOUNDATIONS

Established decision theory can be readily applied to given DSS tasks to produce meaningful and applicable solutions to complex real-world problems. The application of critical thinking can lead to better appreciation of the benefits that decision theory can bring to decision support systems design. In the context of the ISM course, critical thinking "entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue; assumptions; concepts; empirical grounding; reasoning leading to conclusions; implications and consequences; objections from alternative viewpoints; and frame of reference" (The Foundation for Critical Thinking, 2019, para. 4). Our data-rich world requires the application of decision theory, decision support systems and critical thinking to empower individuals to manage their lives and careers. A proper grasp of concepts around decision-making, including rationale, underlying assumptions, positive and negative aspects, will support current and future career readiness for information technology degree students.

The concepts associated with decision support systems and their associated statistical procedures are the vital link to asking: why does decision theory help us in our quest for business intelligence? Or perhaps, why should DT be relevant to DSS and ultimately BI? What are the logical, technological and mathematical bases for such concepts? We may even ask, why does it matter if we understand the decision theory and decision support systems concepts underlying the ISM course content, if we believe we can generate adequate solutions to data analysis and make pragmatic decisions without them? However, IT degree students need to base their learning and professionalism on research since "Theory without practice is empty; practice without theory is blind" (Ako Aotearoa, 2021).

DECISION SUPPORT SYSTEMS CONCEPTS AND SKILLS IN THE CLASSROOM

The first session on this topic area started on a Tuesday afternoon on campus with 20 Bachelor in Information Technology (Level 7) students. Noting that there were several mature students with prior computing and work

experience among the other younger students in the class, I could see an opportunity to draw on work and life experiences to inform a fresh approach to teaching decision theory and statistics within the context of decision support systems studies. Some students would be revisiting semi-familiar material and others would be returning to education after some years of employment, and perhaps had never dealt with these topics in an academic context. This seemed to be an ideal opportunity to present the material with a questioning approach at the outset, to enhance student engagement and make theory and practice more relevant. It was also a situation in which to foreground decision theory and decision making in everyday situations. Those more familiar with statistics would have to revisit why and what assumptions we start with, rather than just consider how to start; those returning to study, having had responsibility to make business decisions, would bring with them a questioning approach based on life experience (Why do I need to learn this? What for?).

The lesson commenced with an overview of decision types, ranging from structured decisions to unstructured decisions (Bourgeois et al., 2019), followed by a prompt to the class to comment on what these meant in a practical, everyday sense. This revealed the assumptions that were made (or had to be made) to create some agreed meaning about decision categories. We then observed that some decisions do not readily fall into either category, or thus could usefully be classed as semi-structured decisions. The categorising of decisions framed our shared understanding of what we assumed to make sense and be practically useful. Thus, "learning takes place when new information is built into and added onto an individual's current structure of knowledge, understanding and skills" (Pritchard, 2009, p. 17).

Logically, this approach led on to further sessions involving detailed considerations about the underlying constraints and factors involved in decision making within organisational contexts. Such considerations involved decision priority, decision familiarity, authority to make decisions, preferred styles of decision making, risk aversion and many other facets. The apparently abstract and 'irrelevant' decision theory became even more important in when it came to designing a simple decision support system.

CHALLENGES IN TEACHING DATA ANALYSIS, DATA MODELLING AND STATISTICS

The next class began with illustrating fundamental statistical knowledge including levels of data measurement, descriptive statistics and linear regression. The demonstration activity used a data set with similar characteristics to that used in the summative assessment, but with a different scenario. Setting the summative assessment task within a simple business scenario helped structure the students' thinking in relation to the types of decisions that their decision support systems might support. A selection of relevant statistical capabilities within Excel was explained and applied to the formative assessment data set.

Navigating the statistical terminology proved challenging for the students. Focusing on the graphical output from the data analysis helped quell their anxieties. It seemed that having a clear grasp of the three levels of data measurement (scale, ordinal and nominal) would logically determine which statistical operations would be appropriate (and which would not be appropriate). A demonstration of using Excel to calculate an average value for a nominal variable highlighted the need to ask: what kind of data were we analysing? Why would Excel allow the user to perform such an inappropriate (and meaningless) calculation? Critical thinking again surfaced, with students gradually becoming aware that decision support systems are only as good as the data input, the limitations of the DSS model used and the interpretation of the DSS outputs as they relate to decisions to be made. Simple linear regression formed the core of the DSS model. Despite the somewhat abstract statistical concept that this kind of line-fitting was about, the teacher used a more tangible example of types of mechanical engineering fit to de-mystify the content. Questions about mechanical surface quality control in terms of consistency of fit (distribution of residuals) and the tightness of fit (size of residuals) seemed to work very well and helped students realise that these concepts occur in other fields and do have real and practical consequences.

By this time, the class was beginning to get curious about which variables in the summative assessment data set to select for analysis. What decisions about the variables would be needed before we proceeded with statistical analysis and applied simple linear regression appropriately? The need for decision theory and deciding what types of decisions we wished to make became more evident. So, one possible flow of events in decision theory application and decision support systems design started to emerge in the class. Perhaps if we began by asking what kind of decisions to make, then decided which variables were likely to provide relevant input to the simple linear regression model, this would be a good start. Next, it seemed that with the selected variables, performing appropriate statistical calculations would make sense. For example, for a café business scenario, exploring a possible linear relationship between an income variable (in thousands of dollars) and café spending (in dollars) might be useful to target specific income groups with coffee specials to optimise income from sales.

As the Excel line fit graph was analysed critically, it became evident that the simple linear regression model had serious issues with validity. The graph had large residuals with a very non-linear distribution. The students began to develop their critical thinking in this decision support systems context and observed that, while some data points coincided with the line of best fit, for many others it did not. The students also saw that there were outlying values that did not seem to belong to this model. Perhaps they were spurious? Could we exclude them from our analysis to make the DSS task easier? Was this correlation present or did we impose this on the plot? We began to see just how valuable critical thinking is, even in the middle of 'statistical number crunching.' In the context of experiential learning theory, teachers, acting in the subject expert role, "often teach by example, modelling and encouraging critical thinking" (Kolb & Kolb, 2017, p. 18).

We finished the week with a view to further decision support systems development. As students began to experiment with the variables in the formative assessment data set, a need arose to filter data by grouping them into meaningful categories. Each category could then be analysed for descriptive statistics with a view to exploring possible correlations between various measured variables. Providing a free-thinking and safe teaching environment supported the students' motivation to value trial and error in their learning. This helped the students to grasp the rationale for standard statistical procedures, while acknowledging that experience, instinct, and guesswork still have a role to play in analysis and design of DSS. This approach tapped into their creativity and problem-solving dispositions.

Slowly but surely, the students' awareness of the interconnectedness of decision theory, decision support systems and critical thinking stimulated an approach to apparently abstract topics, such as statistics and data modelling, marked by a more open, and sometimes playful, disposition. It was encouraging to see the students making conceptual links among the DSS theory, decision theory, statistics, and business intelligence. Also, it was reassuring to sense that the sessions catered for different learning styles (Honey & Mumford, 1986) including those who prefer to learn by doing (activists), those who stand back and observe (reflectors), those who like to see how things fit into frameworks and concepts (theorists) and learners who are happy if a method works (pragmatists). Use of a ubiquitous application like Excel made the learning process sufficiently smooth and immediately useful, without students having to learn a completely new and complex decision support system which might feed on big data, with all its attendant demands.

CONCLUSION

The embedding of critical thinking in teaching and learning at SIT encourages students to challenge themselves and their often-hidden assumptions about the topics they study, the concepts that are needed and the dispositions that accompany them. This article has outlined some of the teaching and learning approaches where decision theory is foregrounded and reflected on various perspectives relating to the application of decision theory, decision support systems and statistics. All the students involved achieved their learning outcomes with enhanced critical thinking to take with them on their academic or employment journeys. Not only did the

students graduate with their Information Technology degree, but this course prepared them for postgraduate study and beyond. Thus, the students could build on these foundations when using more complex analytical platforms and applications

This result was achieved by the teacher and students collaboratively building the foundations of a simple decision support system by using decision theory and statistics supported by critical thinking, within the context of an elective final-year Bachelor's degree course in Information Systems for Management (ISM) at the Southern Institute of Technology.

John Mumford is an IT lecturer at the Southern Institute of Technology. His research interests include teaching innovation, mathematics education, adult literacy and numeracy, and postgraduate IT education. John has a Master of Adult Literacy and Numeracy and is committed to empowering learners to develop their critical thinking capabilities.

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Article

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IMPACT EVALUATION OF LEARNER EXPERIENCE AND ACHIEVEMENT IN AN ONLINE MASTER OF APPLIED MANAGEMENT

Jerry Hoffman, Robyn Hill and Warren Smith

INTRODUCTION

While online education has been part of the adult and further education landscape for some time, it has recently gained greater importance and attracted larger numbers of learners. However, in the past two years, due to global impacts from the COVID-19 pandemic, learners' ability to progress study and gain tertiary qualifications in the online environment has seen an increased uptake of this mode. While this move has been forced upon some institutions (Gallagher & Palmer, 2020), at Southern Institute of Technology (SIT), Invercargill, New Zealand, online learning opportunities for learners (Level 3 to Level 9 of the New Zealand Qualifications Framework), have been long established. The Master of Applied Management (MAM) Programme is an example. This qualification is for management practitioners and recent graduates (domestic and international) wishing to undertake advanced study, often with a view to obtaining a more senior work role.

This Level 9 Programme comprises both compulsory and elective papers, to a required total of 180 credits. The four compulsory papers are:

- MGT801 *Management Practice;*
- MGT802 *Researching Management Issues and Trends;*
- MGT803 *Research Proposal,*
- MGT804 *Research Methodology and Proposal,* a combination of MGT802 and MGT803, which commenced delivery in 2021.

All compulsory papers must be completed before enrolment in one of: MGT901 (45-credit research project), MGT910 (60-credit research project) or MGT902 (90-credit research thesis). Since 2017, 207 learners have completed at least two compulsory papers delivered through SIT2LRN, the institute's distance learning faculty (Figure 1).

Year	Papers	Total Learners
2017	MGT801, MGT802, MGT803	39
2018	MGT801, MGT802, MGT803	50
2019	MGT801, MGT802, MGT803	47
2020	MGT801, MGT802, MGT803	71
2021	MGT801, MGT802, MGT803, MGT804	33*
	TOTAL	207

Figure 1. Papers completed/ongoing in the Master of Applied Management (MAM) programme at SIT.

** Ongoing Enrolments*

Note – Data for 2021 included only learners enrolled for the first two 17-week intakes offered by SIT2LRN.

A significant increase in completions (2020) was possibly due to the opportunity provided by the 2020 lockdown to SIT2LRN mature learners (those over the age of 25) who are already in employment. This period may have provided these learners with a chance to fast-track or begin their studies while much of the country was shut down.

LEARNER EXPERIENCES IN ONLINE COURSES

Understanding learners' perceptions of online learning is a complex and multi-faceted subject. Literature about these learner experiences is diverse. While wider research has centred on learners' perceptions of the delivery of papers, communication, facilitation and learners' own management of their learning, this review takes a more generic approach. The material discussed here reflects learners' perceptions of their online learning experience, with the aim of achieving a better understanding of what learners experience while undertaking online courses.

Teaching staff are important in a learner's online learning experience. Fedynich et al. (2015, p. 6) note that teaching staff have "been identified as being vitally important to students' satisfaction" as it relates to online learning. Gray and DiLoreto (2016) corroborate a strong correlation between teaching staff and the quality of learners' learning and satisfaction with online courses. Martin and Bollinger (2018, p. 218) observe: "It is important to note that engagement strategies that support interactions with instructors were valued more than strategies that aimed at interactions with learning material and other learners. Instructor presence is very important to online learners." It is important that staff have the proper preparation for teaching online from both academic and technological perspectives (Chaves, 2021). According to Bollinger and Halupa (2018) learners report that teaching staff are important in helping them to become more engaged with their study and achieving more positive learning outcomes.

Facilitation methods chosen for online courses should be well designed for teaching and learning to be successful. To improve the online learner experience, Fedynich et al. (2015, p. 6) suggest that staff can "ask students for their ideas [and] provide students with structured collaborations by embedding recurring activities that require conversation between partners, encourag[ing] students to dialogue" about course assignments. In contrast, Bollinger and Halupa (2018) note that learners do not regard discussions with other learners and getting to know these learners highly. However, Discussion Boards (DBs) can assist online learners, fostering course-related engagement between learners, and between learners and instructors (Hill & Horrocks, 2020). Having clear expectations and measurable learning objectives to engage learners is important to improve learning; collaborative activities (for example, case studies) can also help foster learner-to-learner engagement. Sadaf et al. (2019) also note that YouTube videos, podcasts and TED Talks can also promote learning.

Learners' engagement with online courses is important for successful outcomes. Martin and Bollinger (2018) confirm that learners engaged with online study are more determined to do well, more satisfied with their course and receive higher academic results. They also note (p. 206) that "student engagement in online learning is very important because online learners seem to have fewer opportunities to be engaged with the institution." Postulating that online learners may have less engagement with their peers "due to geographic separation, diversity in culture, stage of life, type of job and life experiences" (p. 312), Martin and Bollinger (2018) also report that women usually have higher levels of engagement than men, while learners in graduate programmes have higher levels of engagement than those in undergraduate programmes. Alqurashi (2016) found a strong link between a learner's past experience with online learning and their competency with technology, and overall course satisfaction, noting that learners with a low motivation for seeking information were more likely to use library resources rather than online sources.

Compton et al. (2006) consider adult students as 25 years or older. All students participating in this study were 25 years or older (Figure 3) and thus are considered as adults. The Organisation for Economic Co-operation and Development Policy Response to Coronavirus (2020, p. 1) observes that for adult students "much of the training that had started as face-to-face in classroom environments has been pursued online" following the COVID-19 crisis. The flexibility of distant learning allows adult students to benefit from lifelong learning (Kara et al., 2019), although these authors also note that adult students need programs that are designed to meet their requirements. Learners' multiple roles – such as parents, workers, partners, and students – must be considered, as they add additional responsibilities and workloads for adult students (Kara et al., 2019).

This brief review highlights the need for tertiary institutions to recognise skilled teaching staff, delivery methods, learner engagement with their course, and learner motivation as important considerations in overall educational strategies. Learners' perception of online course experiences is multifaceted. The research in this study attempts to add to the existing knowledge on this topic by investigating learner experiences in an online Master's-level course.

Moving to focus on the individual learner, the impact evaluation (Owen, 2007) research we undertook concentrated on a process-outcome approach, asking: "How have the compulsory papers in the MAM supported online learners to develop the requisite knowledge and skills to achieve successful outcomes to continue with either a supervised research project or a research thesis?" The research sought feedback from past learners to guide further development of the programme, and to gain insights into experiences of online Masters' programmes more generally.

METHODOLOGY

The research population comprised any past learner in four compulsory MAM papers (MGT801, MGT802, MGT803 and MGT804) taught through SIT2LRN between 2017 and 2021. Data collection was limited to learners who had completed at least two of the compulsory papers to ensure that feedback did not reflect one particular facilitator.

As the three researchers all worked for either SIT or SIT2LRN, and the lead researcher was a facilitator of three of the four compulsory papers, the lead researcher did not undertake the initial analysis of the data in order to reduce potential bias.

The interview sample was purposively selected based on the expression of interest indicated by respondents on the questionnaire. A mixed-method approach ensured a greater depth of feedback in the interviews than was possible through the questionnaire. The questionnaire gathered responses to specific questions (demographics, content, delivery, organisation and facilitation, and student effort and workload), while the interviews explored interviewees' experience of the papers, perceived support in developing academic skills, level of preparation for the project or thesis, and the value of their experience with the facilitators.

Questions were piloted and modified according to the comments. Questionnaire and interview questions aligned with the research question, and were framed based on five major factors:

- objectives;
- impact of time between completion of compulsory papers and undertaking project/thesis;
- role of facilitator as it supported achievement in compulsory papers and readiness for project/thesis;
- design of learning materials, and
- relevance of assessment activities.

A database of potential respondents was constructed at SIT2LRN and the questionnaire link was sent by an administrator (not associated with the project). Ethical approval, Number 2021/39, was obtained from the SIT Human Research Ethics Committee.

The 20-minute, Survey Monkey questionnaire concluded with an invitation for respondents to self-identify via email for the interview, conducted via Blackboard Collaborate. Written consent was gained and with the individual's permission, the interview was recorded, allowing the recording to be forwarded, together with a transcript, to the interviewee for verification.

Thematic interview data analysis (Braun & Clark, 2006) was followed by code identification. The main codes included positive reference to the following variables: value of feedback from facilitator, motivation generated through that feedback, clarity of content, usefulness of video presentations, appreciation of immediate and regular email contact, specific and helpful advice via email/visual presentation, detailed feedback/advice on assignments, and interaction generated through Discussion Boards. Less positive codes related to unhelpful or irritating group work and the challenge of time limitation in the papers.

Inductive analysis of interview data involved identifying, analysing, and intepreting patterns of meaning within the qualitative data. Codes were collated thematically (Braun & Clarke, 2006, p. 35). Key themes included presentation and content of material, effective communication, detailed feedback, perceived support, and challenges to effective work. While the themes strongly related to the data, some alignment of themes with the questionnaire and interview questions was noted. Nevertheless, the questions did not provide a preconceived framework for the analysis. Although Braun and Clarke (2006, p. 15) note that there should be "disjuncture between" questions asked and themes identified, a degree of similarity was nonetheless found.

Findings and recommendations were presented according to Owen's (2007) impact evaluation approach which is "concerned with establishing what works and why" (p. 255) in a particular programme. Findings were categorised as "process" or "outcome" as this form of impact evaluation has been used to review "mature programs" (Owen, 2007, p. 258) to consider how programme implementation is reflected in the programme outcomes.

Analysis of the questionnaire data revealed some interesting demographic data:

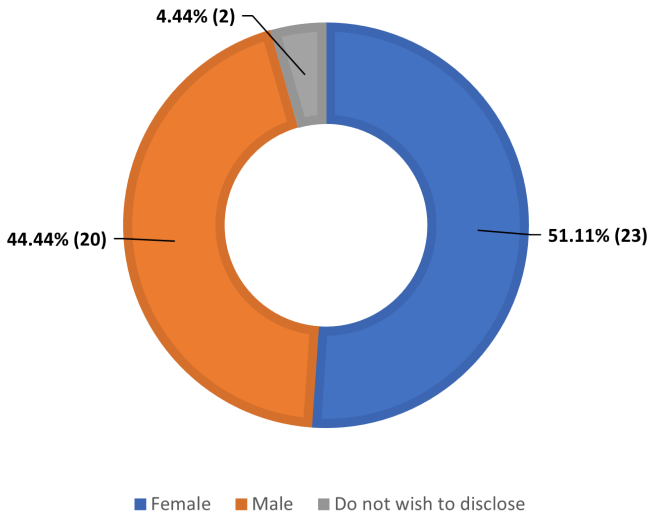


Figure 2. Gender of respondents.

Of the 45 respondents, slightly more females responded than males, consistent with the overall SIT2LRN demographic data.

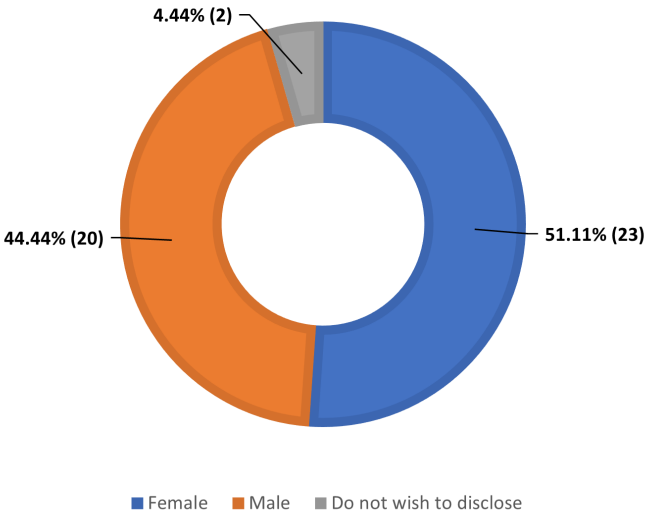


Figure 3. Age when respondents first undertook the compulsory papers.

Eighty percent of the respondents were 35–54 years of age, a figure consistent with overall SIT2LRN demographics.

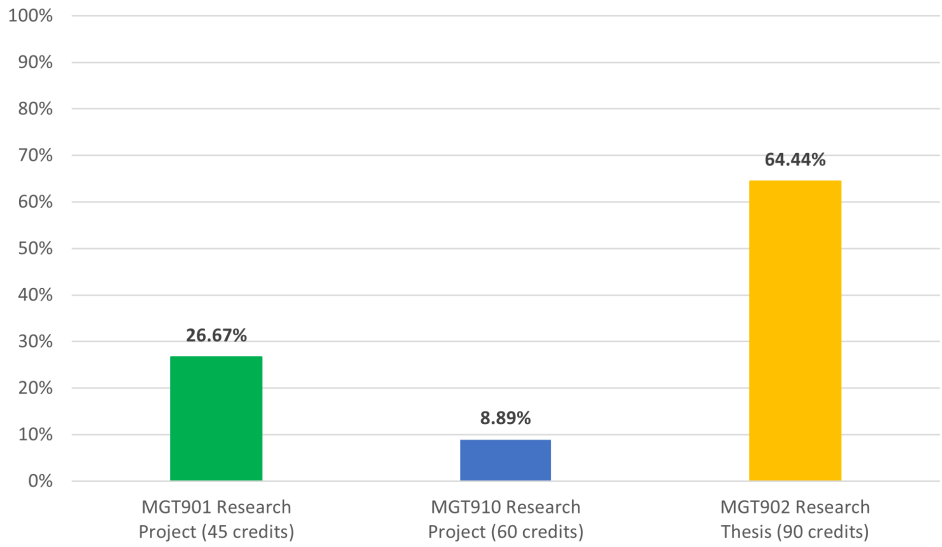


Figure 4. Study pathway respondents planned to pursue.

While the programme does offer 45 and 60 credit research projects, 64 percent of respondents planned to complete the 90-credit thesis pathway.

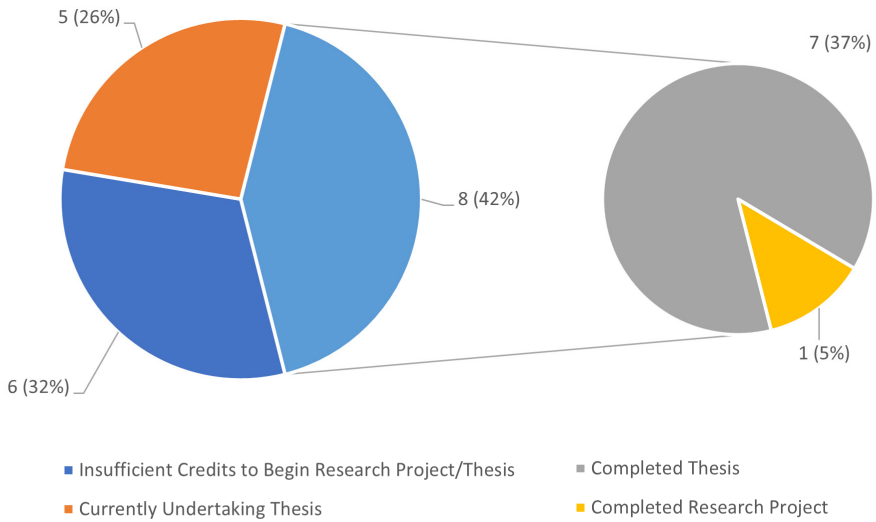


Figure 5. Study pathway that interviewees pursued.

Of 19 respondents interviewed, 12 (63 percent) had completed or were in progress with their thesis, one (5 percent) had completed the research project, and six (32 percent) others had not yet completed the required credits to begin their final paper.

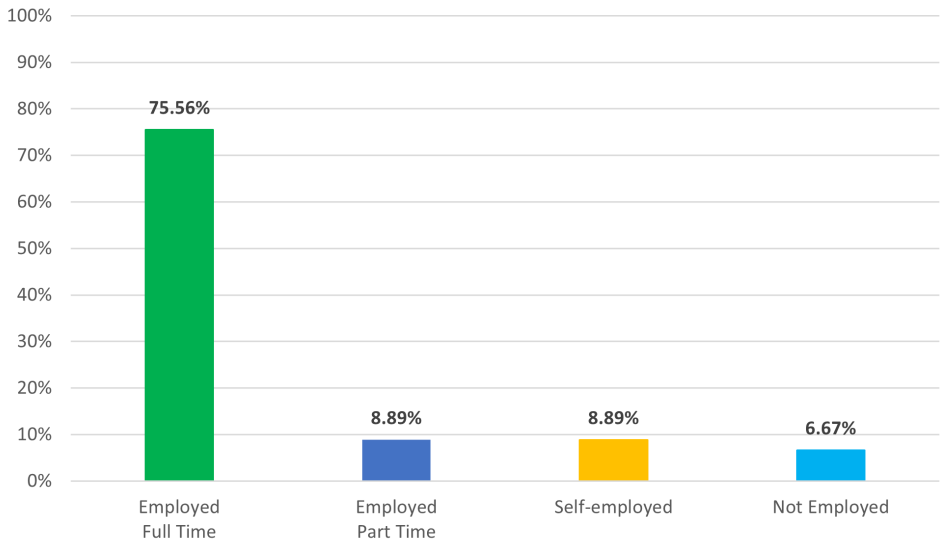
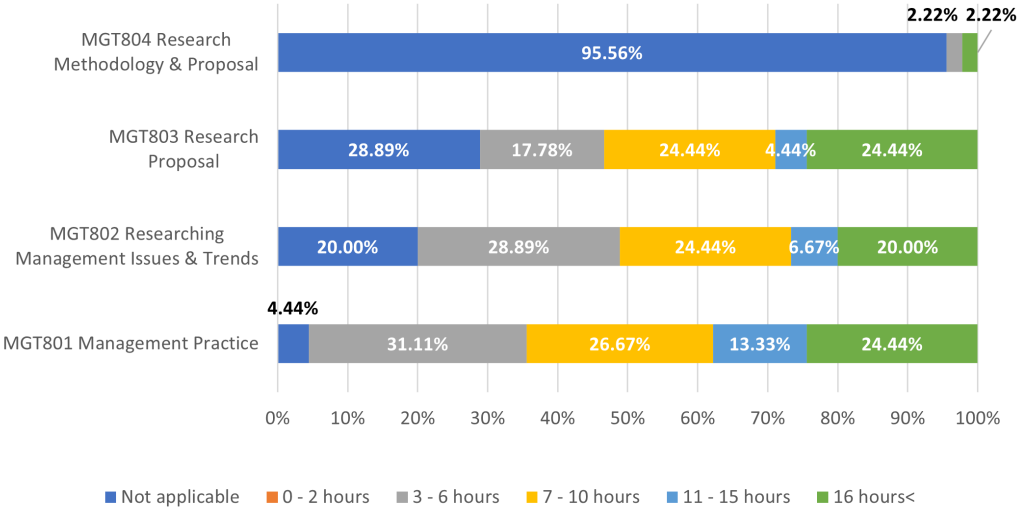
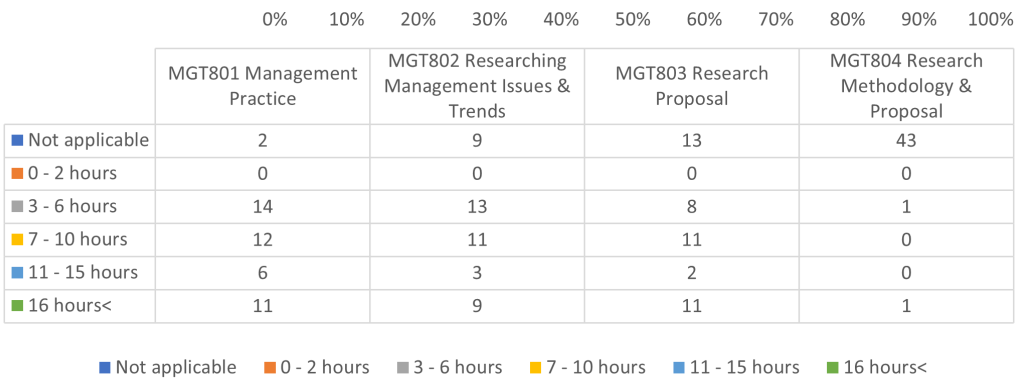


Figure 6. Employment status of respondents when compulsory papers were undertaken.

Most SIT2LRN learners are employed. Of the 45 respondents, 76 percent were in full-time employment while studying, demonstrating a commitment to furthering their education.





	MGT801 Management Practice	MGT802 Researching Management Issues & Trends	MGT803 Research Proposal	MGT804 Research Methodology & Proposal
Not applicable	2	9	13	43
0 - 2 hours	0	0	0	0
3 - 6 hours	14	13	8	1
7 - 10 hours	12	11	11	0
11 - 15 hours	6	3	2	0
16 hours<	11	9	11	1

Figure 7. The approximate number of hours per week in study.

Approximately 50 percent studied for ten hours or less per week per paper, below the figure recommended by SIT2LRN. According to NZQA recommended guidelines, where one credit equates to ten hours of study, a 45-credit paper is 450 hours over 17 weeks (26.5 hrs/wk), a 60-credit paper is 600 hours over 34 weeks (17.6 hrs/wk), and a 90-credit paper is 900 hours over 34 weeks (26.5 hrs/wk). More than half the respondents felt they had invested sufficient time in their studies, and over 50 percent stated that they accessed reading beyond recommended material.

RESEARCH ANALYSIS AND FINDINGS

Questionnaire analysis and findings

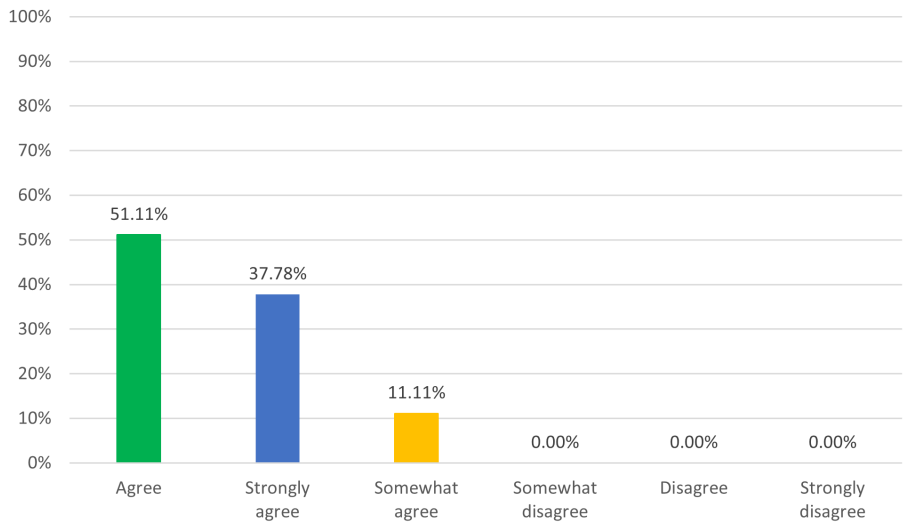


Figure 8. "Respondent experience of the papers matched the information provided in each paper outline."

Eighty-nine percent agreed that experience of content matched the information provided, while 92 percent agreed that they understood what they were expected to achieve the learning outcomes; Sadaf et al. (2019)

found that clear expectations and measurable learning objectives help engage learners. Encouragingly, 91 percent considered that assessment activities supported learning; 96 percent believed that content was designed to extend knowledge of theories, concepts and practices, supporting the learner to understand complex concepts.

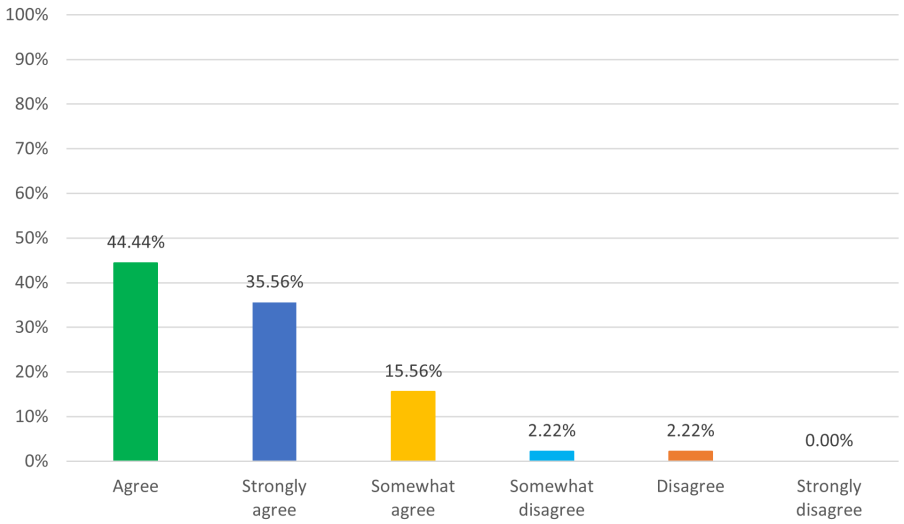


Figure 9. "The learning environment of the papers was open and inclusive."

Structurally, more than 80 percent considered the learning environment to be open and inclusive. A similar percentage noted Discussion Board activities assisted them to achieve intended learning activities, consistent with the findings of Horrocks and Hill (2020).

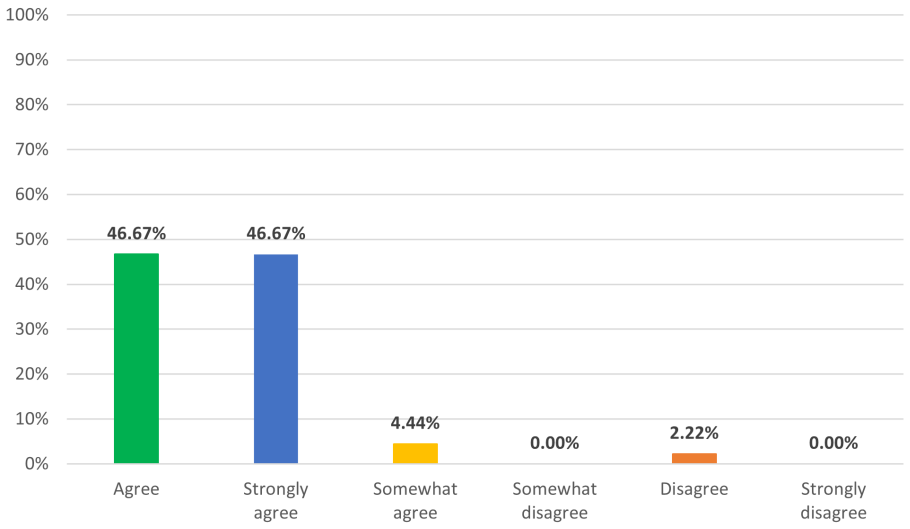


Figure 10. "Through the stated learning outcomes, respondents understood what they were expected to achieve."

Delivery, organisation and facilitation were all favourably considered; over 90 percent clearly understood the organisation of the papers, and what was expected of them. A similar percentage were satisfied with Blackboard for access to content and assessments.

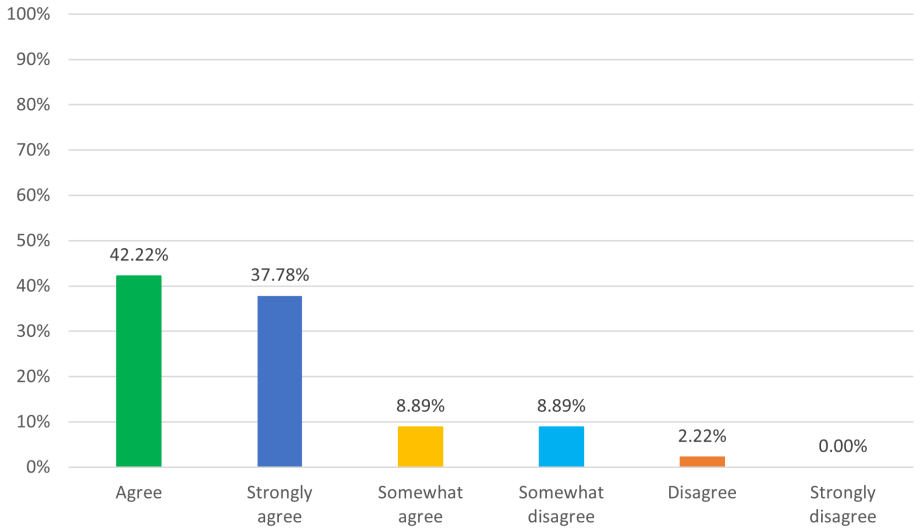


Figure 11. "Respondents received prompt feedback from their facilitators."

Facilitator support rated highly; 87 percent received prompt feedback from facilitators. Over 90 percent noted that facilitators communicated what was expected of the learner in the papers and encouraged them to actively engage in their learning, while providing useful feedback. Strong facilitator engagement aligns with research by Fedynich et al. (2015), Gray and DiLoreto (2016) and Martin and Bollinger (2018) regarding the importance that teaching staff have on a learner's online learning experience.

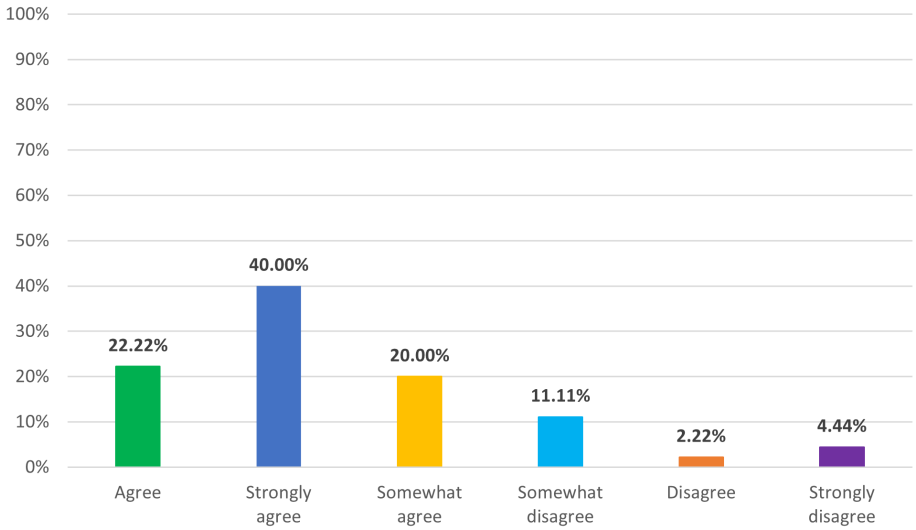


Figure 12. "Respondents were able to learn by collaborating and discussing with other learners."

Collaboration with other learners was rated highly by only 60 percent of respondents. Bollinger and Halupa (2018) note that learners may have less engagement with peers because of geographic location, separation, cultural diversity, type of employment and life experiences. Support from facilitators and SIT2LRN (nearly 80 percent) and family and friends (80 percent) was valued, and almost 93 percent of respondents considered that papers provided them with positive learning experiences.

Interview findings

Nineteen, 45-minute interviews were conducted using Blackboard Collaborate. Findings were categorised using the process-outcome evaluation model (explained above):

a) Process

- Content and structure
- Delivery
- Facilitator support.

b) Outcomes

- Preparation for project/thesis
- Overall experience
- Improvements.

These elements will be further discussed in the Research Recommendations and Conclusion.

Process – Content and structure

Learners noted the value of a weekly program. Some had not studied recently, and realised that there was a big workload to tackle in a short amount of time. They valued the way the three papers interlinked and built on each other. Most found real-time contact with a facilitator valuable; one respondent noted, "I really enjoy being able to have a conversation with my facilitators, so perhaps that should be looked at. The ability to correspond

face to face and get real time feedback is very beneficial." Many found the Discussion Boards useful, supporting the findings of Hill and Horrocks (2020), noting that they were good for supporting new skills development and learning from others. As one participant remarked, "the activities where we had to write our answers were good; you learned from others after posting to the DBs." As Sadaf et al. (2019) found, case studies were also valued as reality-based, and as supporting meaningful learning.

Papers were viewed as highly applied. One learner observed: "The applied nature runs through the whole DNA of the Master's." In terms of improvements to the content and structure, learners indicated that online materials and videos were particularly helpful, and content and structure were deemed to be satisfactory: "The content of the modules was good. I don't see how it might be done better."

Process – Delivery

One learner valued the way "it [delivery] was always from simple to more advanced learning. I could build on my already learned knowledge, so that was the thing … I enjoyed." Weekly activities kept another learner on track: "The approach through the papers was really good." Discussion Boards were also valued. There were some aspects identified for improvement, such as the need for more specific feedback. Acknowledging papers are delivered online, one learner said, "there should be more contact with the facilitator." A final suggestion related to making the rationale for activities explicit. One learner observed, "I would have appreciated it more if we knew the rationale for these exercises and activities; making the intention explicit. We have the Learning Outcomes but not necessarily the skill outcomes." This observation is consistent with Sadaf et al. (2019), who highlight the importance that clear expectations and measurable learning objectives play in helping engage learners to improve learning. This relates to the need for learners to understand the "why" of undertaking activities, and how they correlate with learning outcomes.

Process – Facilitator support

Learners considered that facilitators provided support and encouragement during the papers, factors which are important in online learning (Fedynich et al., 2015). Facilitators were "supportive, approachable and flexible [and] kept me engaged and encouraged." Another learner noted: "It is great to have someone with experience who can go 'this is where we should be at.'" Feedback was the subject of numerous comments, including: "Getting that live feedback and understanding was good. The Skype formative assessment and feedback was really valuable," and: "Feedback was excellent as were the marked-up comments on the assignments – this is brilliant because as a distance learner, you don't get that contact otherwise." Regular and positive contact with the facilitator rated highly: "There was regular contact with both facilitators; the key was whenever I did have a question it was answered really quickly." One desired feature was more connection with the rest of the class, particularly using Blackboard Collaborate: "I think it would have been beneficial to have something like Collaborate in those papers. In the first paper we all got together on Skype and connections were not good. It was run by the facilitator – not the best way. Collaborate seems so much better."

Outcomes – Preparation for project or thesis

Kara et al. (2019) noted that adult students need programmes designed to meet their requirements. A number of skills were valued by the learners, including "soft skills" and more practical academic skills: "I think it is those soft skills; about meeting deadlines, writing, researching, being able to reference correctly, being curious, thinking about topics that are relevant in business management." The solid scaffolding of papers was valued. For one learner "they helped enormously. A thesis is a bit of a scary unknown so step by step it got me closer. There was solid scaffolding and progression – no sudden shock." A sense of discovery featured in the comments in noting

that research can "widen your perspective; they help you to understand the strategic implications of what you do in organisations." Excellent ideas for improvements were proposed for preparation for the project or thesis. More detail about a range of methodologies would be helpful, because "knowing what time requirements are needed for different methodologies would have been very good."

Outcomes – Overall experience

There was a good balance of comments regarding the overall experience. The first of the three compulsory papers was considered a "heavy workload," although content was stimulating. One learner commented: "[The first paper] was heavy but you need that to motivate you; I loved the content. Not just one thing to look at – it was relevant for NZ and we could find resources for the cases really easily." For another learner, "it got me in the momentum of study again." However, a third learner cautioned, "You need to be realistic about the workload. It is tough to give up every evening. If you are working part time you can take more than one paper but if working full time be careful." Kara et al. (2019) support the need for students to give consideration to their multiple roles as adults.

Again the quality of facilitators was considered important in student engagement, supported by Bollinger and Halupa (2018). One learner explained that "the quality of tutors all the way through was really strong [and] I can comfortably say that the tutelage and course design on most of the papers was really good; none were below par." Another supported this judgement: "The approachability and flexibility of the facilitators really helped me to be engaged and encouraged [me] to be in it."

Outcomes – Improvements

Potential improvements to papers were identified. Feedback, unsurprisingly, featured highly. More uniformity and consistency of feedback was requested: "I had one facilitator that gave a lot of feedback on my work, at the end of the rubric they would explain what I had done well and what I can improve; the other facilitator would just give me feedback on the rubric. If there was some way of having more uniformity of feedback; that would be good." Another noted: "I think that in other papers when you got the feedback on assessments that was often a score or a repeat of what was on the rubric; it wasn't adding any additional feedback that was beneficial to my learning. I think that was a deficiency."

Discussion Boards (DBs) were valued by some learners: "I think when the DBs are used properly, they add value. I would not get rid of them. Perhaps seed the Social Discussion tab with ideas for comment." However, improvement in timing was recommended: "I felt confident posting to the DBs but most of the time there was no alignment between the learner posts and the assignment due date. There was a kind of incongruency because people were commenting at different times."

One learner identified the potential value of having access to a mentor following completion of their studies: "I think that having a mentor (not an academic mentor) would be such a great informal opportunity; you could ask those questions that might seem a bit silly; gather more resources. It's a different kind of relationship."

RESEARCH RECOMMENDATIONS

Based on the findings from this research, the following recommendations are offered to academic and educational programme managers and facilitators.

Focus Area	Recommendations
Structure and Content	• If learner satisfaction with the overall papers is high, retain the basic structure. • Consider minor adjustments to content; adding further diversity in methodological approaches, and an introduction to how to conduct an 'Industry Theory and Strategic Analysis.'
Communication and Interaction	• Interaction and communication between learners and facilitators should be a priority. Each facilitator can decide how this can be done, e.g. through effective use of Collaborate or Skype. • Initial discussion with learners about what study at the Master's level involves. For example, the need to deeply explore subjects, look at different points of view, and construct justifying statements. • Individual interviews to monitor progress conducted with learners half-way through each paper. • As part of the orientation to the programme, advise learners of time requirements and need for good time management. • From the commencement, advise learners how all the papers are interrelated and how this is all connected to the project/thesis.
Programme Management	• Aim to enhance learner-to-learner interaction, e.g. through using Discussion Boards. • Ensure learners receive timely, effective, and consistent feedback to enable them to improve in subsequent performances. • Ensure learners understand the rationale for exercises and activities, and ensure activities (e.g. Discussion Board) link to the assignment tasks. • Facilitators and programme managers should foster a strong community of practice among not only postgraduate learners, but all distance learners.
Technology Access and Knowledge	Consider learner demographic and knowledge, and that learners are often returning to study after long absences. Provide supportive tutorials, training sessions, and access to academic resources (e.g., MS Office suite).

Figure 13. Research recommendations.

CONCLUSION

Through examining the secondary data, and responses from the questionnaires and interviews, several recommendations have been made to contribute to research in this area. Some recommendations are purposefully generic. This is to help learners and facilitators better apply these recommendations to their own situation.

While one limitation of this research was that it was undertaken in a regional Institute of Technology and was related to a specific Master's programme, most of its conclusions could be applied to a wider audience of online learners. Perhaps further research could be aligned to understanding how this research compares, for example, with online study in a university setting.

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Case Study

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MICROSOFT TEAMS BREAKOUT ROOMS FOR ONLINE DELIVERY

David Bettis

INTRODUCTION

The COVID-19 pandemic presented many challenges and barriers for the education of engineering students worldwide. At Otago Polytechnic, Aotearoa New Zealand, lecturers from around the institute were forced to adapt their teaching practice significantly in order to provide quality online learning to their tauira (learners). At the time of the outbreak of the pandemic, Microsoft Teams was relatively new to Otago Polytechnic kaimahi (staff), who had little to no knowledge of the functionality of the software, or of best practise for online teaching. Employing Gibbs's Reflective Cycle, this article describes the situation, reflects on learner feedback and explores the implications for future practise in education.

GIBBS'S REFLECTIVE CYCLE

Professor Graham Gibbs published his reflective cycle in his 1988 book Learning by Doing. The purpose of the model is to provide a structure for exploring and learning from experiences. The model is cyclic in nature, which lends itself well to the continuous improvement of experiences that are repeated. The model covers six stages:

- *Description* of the experience
- *Feelings* about the experience
- *Evaluation* of the experience, both positive and negative
- *Analysis* of the situation
- *Conclusion* about the learnings and what could be done differently
- *Action Plan* for dealing with similar situations in the future.

Gibbs explains that the first stage in the process is mainly descriptive and encourages the user to "simply describe" and not to "make judgements yet, or try to draw conclusions" (Gibbs, 1988). The second stage of the cycle asks the user to describe their reactions and feelings, taking care not to analyse their feelings at this point. The third stage, Evaluation, gives the opportunity to describe what was good or bad about the experience. The next stage of the cycle, Analysis, prompts the user to make sense of the situation and what was really going on, encouraging them to bring in ideas from outside the experience as well. Gibbs advises the user to compare different people's experiences to see if they were different or similar in important ways. The fifth stage of the cycle is to examine what can be concluded from the experiences, both generically and specifically. Lastly, the Action Plan stage encourages the user to consider what they would do differently in a similar situation, on the basis of what they have learned from the experience.

DESCRIPTION

This article tells the story of part of Otago Polytechnic's COVID-19 response in the College of Engineering, Construction & Living Science team. Our Year 3 Bachelor of Engineering Technologies learners specialise in either a civil, electrical or mechanical discipline. A number of Year 3 courses are common to learners from each of the three disciplines, such as Professional Engineering Practice, Project Management, Risk Management and an Engineering Development Project.

These courses rely heavily on group activities, which involve discussions of a number of engineering case studies with other learners from their disciplines, but also in a cross-disciplinary environment. This allows learners to share experiences from their own engineering contexts, and for learners from other disciplines to not only learn from them, but to provide feedback on those experiences from another perspective.

In March 2020, approximately three weeks into the beginning of the MG7121 Professional Engineering Practice course, the New Zealand government announced the first Level 4 lockdown of the COVID-19 pandemic. Otago Polytechnic responded by issuing notice to its staff and learners that learning would move to online delivery via Microsoft Teams. Staff and learners were unfamiliar with the use of Microsoft Teams as a communication or collaboration tool. Typically, engineering programmes at Otago Polytechnic are delivered on campus in a face-to-face setting.

It was decided that the use of a breakout room facility within Microsoft Teams could be employed within the MG7121 Professional Engineering Practice course. This would enable the lecturer to facilitate group activities and discussions in separate online 'breakout rooms,' eventually returning learners to the 'main' session to discuss each of the groups' findings from their group activities.

The next stage of Gibbs's reflective cycle is to describe the reactions and feelings which relate to the experience.

FEELINGS

Naturally, the announcement of the first COVID-19 cases in Aotearoa New Zealand created a lot of anxiety. Many of our staff and learners felt that moving to an online learning setting was the correct thing to do in order to minimise the risk of catching or spreading the COVID-19 virus. However, it was widely accepted that online learning would be challenging for everybody for two main reasons. Firstly, engineering lecturers had no previous experience of facilitating online learning or, in fact, what best practice would involve. Secondly, our engineering learners had never experienced learning in an online setting, although most of our learners at that level had a high level of digital competency and familiarity with computer technology.

Some staff were quite concerned that the quality of learning would suffer as a result of the shift to online learning. The majority of staff focussed on the challenge ahead and embraced the opportunity to learn new skills, utilising online resources and Otago Polytechnic's own Learning & Teaching Development service department to understand techniques that could be applied to achieve engaging and effective online learning sessions.

The next stage of the process is to evaluate what was 'good' or 'bad' about the experience, taking care not to analyse why at this stage.

EVALUATION

It was decided that the best way to evaluate the effectiveness of the MS Teams breakout rooms for online delivery was to create a survey for the learners of MG7121 Professional Engineering Practice to complete. The lecturer liaised with Otago Polytechnic's Organisational Research department to create a simple yet effective

questionnaire which was issued to the learner cohort at the end of semester. The questionnaire gave each learner the chance to reflect on the effectiveness of breakout rooms for online learning; how the experience could be improved; how well they stayed on track during the group activities; how well the lecturer supported them during group activities; and how well the presentation of the findings of the group activities worked. Each of these points had a rating, ranging from "not well (effective) at all," "slightly well," "moderately well," "very well" to "extremely well." After responding to each point with a rating, the learners were encouraged to add a comment to describe what did or didn't work well, in order to provide helpful feedback.

The questions in the survey were focused on the use of the MS Teams platform and the effectiveness of the breakout room facility for hosting group activities. There was no intention in the survey design to assess the effectiveness of the actual activities. The activities had previously been utilised in a face-to-face environment and were found to be effective group exercises to promote learning of the subject matter. The main aim of the survey was to determine if breakout rooms were an effective tool for the delivery of group activities in an online environment.

The results of the survey are tabulated in Figures 1–3:

How would you rate the use of MS Teams breakout rooms for group activities?

Answer	Response	%
Not effective at all	0	0%
Slightly effective	3	18%
Somewhat effective	4	24%
Moderately effective	9	53%
Extremely effective	1	6%
Total	17	100%

Figure 1. Using MS Teams breakout rooms for group activities.

The learners suggested that the main reason for the breakout rooms being effective was that it was easier to have conversations in smaller groups than it was in one larger group. Learners felt more comfortable engaging in discussions and noted that there were fewer distractions in a breakout room than in a classroom setting. Some reasons for lower ratings of effectiveness included: not being sure how to use the facility, not being clear on what breakout room to join and some learners not having access to hardware, such as microphones or cameras, in order to contribute effectively. It was also suggested that the learners in each group prepare a document, such as a mind map or flow chart, for the final presentation, rather than rely on one or two group members to talk about their findings.

How well did your group manage to stay on track with the activity during the breakout session?

Answer	Response	%
Not well at all	0	0%
Slightly well	2	12%
Moderately well	9	53%
Very well	5	29%
Extremely well	1	6%
Total	17	100%

Figure 2. Staying on task during the breakout session.

Feedback from learners indicated that they felt supported by the lecturer during the activity. The lecturer spent time in each of the group breakout rooms to ensure that they were on track with the objectives of the activity and provided feedback to each group on their ideas and how they could develop them. The learners also commented that they found it helpful to have the activity posted in MS Teams prior to the session, so that they could read and understand what the activity entailed.

How well did the presentation of the group findings of the breakout room activities work?

Answer	Response	%
Not well at all	0	0%
Slightly well	4	24%
Moderately well	8	47%
Very well	5	29%
Extremely well	0	0%
Total	17	100%

Figure 3. Presenting group findings in breakout rooms.

Learners commented that responsibility for the presentation of the findings normally fell to the most vocal member of the group. Groups that used visual aids found it much easier to present the information. It was also mentioned that some group members were either too shy to present or didn't have the technical hardware to do this.

After careful evaluation of the results of the leaner survey, the next step of the cycle was to analyse the situation.

ANALYSIS

Through careful analysis of the learner feedback and survey responses, it was found that the learner cohort generally found the use of MS Teams breakout rooms to be effective. Learners noted that they felt more comfortable and likely to engage in conversation when in a smaller group than in the main session. Learners who were digitally competent and had access to hardware such as a personal computer, webcam or microphone were much more likely to engage and even lead group activities. Learners who were using a device such as a smartphone to connect, or who had limited hardware or poor broadband connections, found it difficult to engage fully in activities.

Feedback suggested that there was some confusion over the allocation of breakout rooms to learners. It is worth noting that at the time of delivery, MS Teams had limited breakout room functionality and the facilitator had to manually create session with MS Teams Channels, pointing each learner to a specific room to 'dial' into. Improvements to MS Teams have since been implemented which will mean that this will no longer be an issue, as the facilitator will transfer the learners to the correct breakout room at the 'press of a button.'

Some groups reported that they didn't always stay on task with the group activities. Factors which contributed to this included the confusion surrounding breakout room learner allocation and learners' failure to complete the pre-reading of the activity brief or support documentation prior to the session. It was significant that the facilitator spent time with each group to 'check in' and ensure that they all understood the task requirements and were using the time allocated productively.

Learners were less satisfied with the effectiveness of the presentation of the groups' findings from the breakout room activities. This was largely due to the feeling that the responsibility of presenting fell with the "most vocal member" of the group. Some techniques which could improve this in future practice could be to have a roster for presenting the information, or perhaps for the facilitator to have predetermined questions that could be issued to each individual group member. This would promote fairness and inclusion within the activity and hopefully resolve the issue of resentment, arising from the perception that some learners engage in the presentation and others within the same group do not.

Following analysis of the situation, the next step is to draw conclusions from the learnings about the experience and determine what might be done differently.

CONCLUSION

Online collaborative learning (OCL) is an approach that is "very different from the more objectivist approaches found in computer-assisted learning, teaching machines and artificial intelligence applications to education" (Bates, 2014). Bates states that these methods largely seek to replace some of the activities which would normally be carried out by human teachers. With online collaborative learning, the aim is to enhance the communication between the teacher and learners via the use of technology. Communication is managed in a way that supports learning by assisting with the construction of knowledge, taking into consideration the learner's prior subject knowledge.

Overall, the use of MS Teams breakout rooms for online delivery was found to be an effective way of engaging learners in group discussions and activities. The results of the learner survey indicated a good level of satisfaction among learners with the effectiveness of the breakout room activities. The survey had a high level of completion by the MG7121 Professional Engineering Practice cohort, with around 90 percent of the learners opting to complete it. The design of the survey was carefully considered to ensure that it was easy for the learners to complete and explored the key reasoning behind each of their responses. The comments provided by the

learners provided valuable insights into what worked well about the breakout room activities and how they could be improved for future practice, either in the event of further COVID-19 lockdowns or as an option for blended delivery.

Preparation is key to the success of using MS Teams breakout rooms for online delivery. It is recommended that learners are well prepared ahead of the session through lecturers providing a brief of the activity and some pre-reading of a scenario, case study or document that supports the activity. This will ensure that learners are utilising the time in the breakout room session optimally. It also provides the opportunity for non-native English language learners to read, translate and understand the text prior to the session.

The final step of Gibbs's reflective cycle is to develop an action plan setting out how similar situations might be approached in future practise.

ACTION PLAN

Learner feedback suggests that one of the main areas for improvement with the MS Teams breakout rooms activities was the need for better visual aids. It was suggested that the group be required to create a document to assist with the presentation of the information or data produced during the activity. The tools offered to learners during the activities were limited to Microsoft Whiteboard. The limitation of this software was its lack of a text input feature at the time of the activity delivery, a deficit which has since been rectified by Microsoft.

When designing activities for breakout room sessions, it should be considered how information is required to be presented by each group to the other groups. The use of mind maps, flow charts, diagrams, work breakdown structures, Gantt charts, spreadsheets and other aids should all be considered, depending on the type of activity planned. It is also important to consider the needs of all learners when planning the design. For example, neurodiverse learners or learners with mental health issues may find it difficult to present the team's findings from the group activity. One technique that might be considered is to provide specific roles within the team, a solution which would avoid creating undue stress on these learners while providing them with the opportunity to equally contribute to the activity.

The choice of digital tools and apps available within MS Teams is vast, and the inclusion of online collaboration tools will only help to prepare learners for an evolving workplace which, post COVID-19, is relying more heavily on such tools to enable workers to communicate effectively in a digital workspace.

We should also investigate techniques for 'digital scaffolding' of online collaboration tools such as MS Teams and associated apps. It is easy to assume that learners born after 1980, commonly known as "digital natives," are skilled in using technology in the educational institution and workplace. However, research published in 2017 claims that there are no significant skills differences between people born after 1980 and older generations or "digital immigrants" (Kirschner & De Bruyckere, 2017). It is an unfair expectation to place on our younger generations that they automatically have a high level of digital competence with digital tools and workplace technologies. As contemporary educators, it is our responsibility to help grow our learners' competence with the digital tools and technologies that will give them the digital skills that are highly desirable in the twenty-first-century workplace.

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Article

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SOCIAL MEDIA AS AN ACADEMIC RESEARCH TOOL: EFFICACIES AND CONCERNS

Philippa Crombie and Cath Fraser

INTRODUCTION: SOCIAL MEDIA AND HIGHER EDUCATION

Social media has been a growing phenomenon since the early 2000s, and is now ubiquitous in everyday life, for personal communication (such as photo-sharing, managing events, requesting and offering feedback/review) and for business and government organisations (direct marketing and communication) (Skold & Feldman, 2014). In academia, such affordances allow researchers access to potential participants, as well as audiences, at a level previously unthought of. However, just because we can use social media, should this always be our first option? This article argues that we are academics first, and must be scrupulous in our critique of both the efficacies and the pitfalls of over-reliance on online communities.

Social media certainly offers tremendous advantages. As an example of user reach, Facebook – the world's largest 'active' social media platform – had 2.910 billion monthly active users in October 2021, and increased by roughly 15 million (+0.5 percent) in the three months leading up to October 2021. These latest figures indicate that roughly 36.8 percent of all the people on Earth use Facebook today (Datareportal, February 2022). While the Social Media Research Group (2016) notes that there are many definitions of what social media is and is not, it offers the simple definition of social media as "web-based platforms that enable and facilitate users to generate and share content, allowing subsequent online interactions with other users."

Social media applications can be grouped into distinct categories such as blogs (which includes Twitter), content communities (such as YouTube and Flickr), social networking sites (for example Facebook, WhatsApp, WeChat and LinkedIn), collaborative projects (wikis and social bookmarking, like Instagram, Pinterest and TikTok) and virtual game and social worlds (Skold & Feldman, 2014).

The use of social media as a communication tool by higher education providers is therefore no anomaly, but rather a logical extension of such digital affordances. Faculties and cohort groups may have Facebook pages, as do many alumni associations. Lecturers and administrators use messaging, tweets and posts to communicate with students, marketing and event coordinators create stories to build an Instagram following – and so it goes (Fraser et al., 2017).

Interestingly, and directly applicable to the subject matter of this article, is a growing body of scholarship which questions and critiques the assumption that the affordances of social media improve faculty–student relationships. Forbes and Gedera (2019), for example, discuss the "potential divide between teachers' intentions and students' experiences, and between teachers' and students' expectations of learning and support" (p. 2). The same authors also observed an additional issue in online communication regarding 'voice,' where students said that they preferred free-flowing, spontaneous vernacular language, but teaching staff and learning facilitators often preferred to model academic discourse, with specialist terminology, and crafted composition. A third field of inquiry related to the use of social media in higher education relates to non-verbal language, such as digital

pictograms, or emojis. A previous study by one of the authors of this paper (Crombie, 2020) revisited some of Evans's (2017) conclusions about 'text-speak' as a way to incorporate non-verbal cues in online communications. It turned out that assumptions, variable user fluency, evolving usage and layers of meaning led to considerable ambiguity. Yet despite such precautions raised by a handful of commentators, conversing and connecting in teaching and learning support via social media is clearly here to stay.

USING SOCIAL MEDIA IN RESEARCH

Academic researchers – staff and students – have also turned to online social media platforms to facilitate participant recruitment and data gathering through surveys and conversations, making use of the extensive range of platforms available. While there was initial doubt cast on the validity of social media data harvested (in the main) by social science researchers – the 'pointless babble' and self-centred messaging loosely associated with issues of public or governmental importance – the various platforms are now perceived to provide promising sources for understanding social and cultural discourses (Shah et al., 2015, as cited in Chen et al., 2021; van Dijck, 2013). Learning and language support staff may themselves draw on social media when evaluating use of their services or resources. It is also increasingly likely that the role of advising others will lead to encounters with digital methodologies – even more so as the impact of the COVID-19 pandemic reinforces the trend to work and study from home (Kara et al., 2020).

Social media research tools can be used in a variety of ways to gather publicly available web data. Audience intelligence company Pulsar Platform (n.d.) lists a variety of options for online research tools. For example, Twitter, Instagram and Facebook analytics offer the opportunity to search keywords, over specific time periods and locations, with YouTube providing a variety of metrics designed to provide information on viewer watch times and traffic. Each of these platforms includes both textual and photographic data, the latter offering a direct and globally understood 'language' which transcends the spoken word. Further, this dynamic 'in-the-moment' view leaves the observer pondering what has gone before and after the image capture; and, crucially, the question of *why* this particular image has been posted, presenting opportunities for observation by the researcher (Chen et al., 2021).

Understanding social trends around specific topics can be achieved through manual 'desktop research' of forums, providing insight into interest around themes and topics (Kara et al., 2020). Online reviews, such as those used in the travel advice forum Tripadvisor, list material which can be themed by researchers; or, because they are often rated against traveller experiences, can provide quantitative data for analysis. Blogs and news platforms provide opinions, with Google Trends providing a free service to track volumes of user searches over time. A plethora of online marketing businesses such as Pulsar offer bespoke tools to aggregate analytics from social media channels, allowing the comparison of data, metrics and trends from competitor accounts. While these are tools used mainly for marketing insights, academic researchers can use the data to discuss research trends and interests within their area of discipline or research enquiry (Moreno et al., 2013).

Advocates of the potential of social media as a way of understanding our social milieu (for example, Beninger et al., 2014; Social Media Research Group, 2016) cite additional benefits such as:

- Offers access to a population with a particular shared interest
- May offer insights into the nature and topics of their conversation, concerns or interactions in a more 'natural' setting than results from traditional online research methods (for example, online surveys, online interviewing or focus groups)
- Offers access to a population not limited by traditional geographic boundaries
- Can provide contemporary, subjective perspectives or experiences
- Time and cost-efficient: allows interaction without the need to meet in person.

Accompanying these many advantages of using social media in academic research, there are also obstacles, challenges and risks (Kara et al., 2020). One ongoing concern for a tertiary institute's research office is ensuring that researchers always represent the institution in a professional, ethical manner. Adhering to a rigorous research process to facilitate this is key to ensuring that both student and staff researchers, participants and the institution are safe. Ensuring that online data cannot be connected to an individual, establishing that there are no issues of intellectual property, commercial sensitivity or competitive advantage that will be transgressed by your analysis, and dissemination of collated material are essential (da Mota & Pickering, 2020). Further challenges noted in the literature (Hennell et al., 2019; Ruths & Jurgen, 2014; Social Media Research Group, 2016) include:

- A Western, Eurocentric worldview predominates which cannot be extrapolated as representative of a wider population;
- Credibility – likely to contain bias and contributions weighted more to one side of an argument than the other (The 'me too' momentum);
- Veracity – participants have little accountability, can hide behind false online identities; and
- Potential for unsubstantiated vilification or adulation of individuals, organisations, products and services (hidden political, economic and social agendas).

SOME EXAMPLES OF SOCIAL MEDIA USE IN RESEARCH

It is likely that most colleagues tasked with supporting staff and students in writing research proposals and, eventually, reports and academic papers, will find that a significant proportion of topics are drawn from the domain of applied research: the application of theory to practice to solve or investigate some aspect of everyday life (Townsend & Wallace, 2016). The following are examples of research projects proposed by Master's students at the authors' institute in 2021 that drew on social media platforms to do just that. It should be noted that this year saw a surge in the use of social media as a key research tool, given that COVID-related controls meant site visits, interviews and focus groups were often off-the-table.

- *Exploring customer service quality perceptions of New Zealand's telecommunications firms*

This was an exploratory study which used content analysis to analyse user-generated content posted from review platforms such as Trustpilot.com and other social media review platforms utilised by Vodafone, Spark and 2degrees (all Aotearoa New Zealand telecommunications providers) such as Facebook. The student analysed 1,000 reviews from 2018–2020 using R Studio and Leximancer software to determine consumer satisfaction and dissatisfaction influences.

- ***Factors influencing customer satisfaction of Air New Zealand***

This study used secondary data publicly available online from airlineratings.com, airlinequality.com and tripadvisor.co.nz. and analysed customers' comments and reviews. The sample included about 1,500 entries related to inflight products and safety in order to identify the factors that contributed to high levels of customer satisfaction. This student used Excel spreadsheets to collate and sort data for subsequent thematic coding and analysis.

- *Exploring job satisfaction among accounting employees in New Zealand*

Similar to the above projects, this research collected 4,000 online reviews from previous and current accounting employees in Aotearoa New Zealand, submitted to the Glassdoor website.

- *Perceptions of New Zealand by users of Tourism New Zealand's (@purenewzealand) Instagram page*

Instagram posts generate a high number of users' responses (comments and likes) and have been found to affect viewers' perceptions of tourist destinations, as well as their travel intentions and discretionary spending. This project focused on marketing and branding, "to better understand and enhance interactive features of the Instagram application."

Other projects looked at customer reviews of hospitality services, such as accommodation providers and restaurants, responses to YouTube video clips of manuals and company promotions, and employee turnover and leaving intentions in specified industry sectors, among other topics.

KEY ISSUES FOR RESEARCHERS, AND TEACHERS OF RESEARCH, TO BEAR IN MIND

Once the above pros and cons have been assessed against the planned research project, there are a number of procedural issues for researchers to consider when writing their proposal.

1. Familiarity

There is an old adage that familiarity breeds contempt. Certainly, many of us, and especially our digital youth, have been socialising in virtual environments for the last decade and more, and can tend to use these media almost unconsciously – and too often, uncritically and unquestioningly. It can be temptingly easy to leverage membership of the various 'rooms,' pages, message boards and other platforms that social media offers, to recruit participants, launch surveys or download data and discussion excerpts. The practical and ethical concerns about these sources, however, need to be considered as carefully as with any other data collection instruments (Townsend & Wallace, 2016). Researchers – both staff and students – must therefore be prompted to consider the fundamental issues of representation, credibility, validity and responsibility to stakeholders as part of their research and ethics proposal.

2. Legislation

In addition to the abovementioned tenets of good research practice (likely outlined in an institute's own research ethics policy documents), there are a number of agencies and rulings (New Zealand Ministry of Justice, 2020) which social media researchers will need to adhere to:

- The Harmful Digital Communications Act 2015 outlines and explains processes to address harassment or bullying through texts, emails, websites, apps or social media posts.
- NetSafe is the government agency charged with internet safety and control of objectionable or harmful material posted online (Netsafe, 2021).
- The Privacy Act 2020 (replaces the Privacy Act 1993) promotes and protects individual privacy by providing a framework to protect an individual's right to privacy of personal information; and recognising international standards, including the OECD Guidelines and the International Covenant on Civil and Political Rights. It promotes early intervention and risk management by agencies (the name used for any organisation or person that handles personal information) and enhances the role of the privacy commissioner.
- The Unsolicited Electronic Messages Act 2007, also known as the anti-spam law, makes it illegal to send spam with an Aotearoa New Zealand link and use software to send unsolicited electronic messages – for example, emails and text messages. This Act promotes a safer and more secure environment for use of personal information, prohibits address-harvesting software and deters inappropriate use of communication technologies.

Researchers using social media are generally accessing publicly available sites and downloading, rather than creating or uploading new material. However, the above legislation needs to be kept in mind when the researcher is filtering sizeable dumps of data, such as the reviews identified in the examples above. The internet is largely unregulated, and researchers need to ensure that their data is 'cleansed' of objectionable material and inappropriate 'outlier' comments which might not only skew results, but potentially perpetuate the offence. There are also occasions when the researcher has access through a particular membership to online content which is closed to the public. In this case, attention to the requirements of the Privacy Act, and the general ethics of good practice in social science research discussed below, come into play (Townsend & Wallace, 2016).

3. Surveys

With the correct protocols in place, social medial platforms offer a useful avenue to share survey information and links. This can be a faster way of collecting data from respondents compared to more traditional face-to-face and paper-and-pencil methods; has minimal, if any, costs; may offer automation in data input and increase response rates; and can provide flexibility of design for the survey type/format (Sincero, 2012). But with sharing online comes the issue of who the survey will be shared to and how widely it may be shared in order to reflect a diverse participant group; and in the absence of the physical interviewer, rich data may not be as easily gathered.

Most social media platforms will not allow surveys to be shared unless through a private group or channel, which of course immediately reduces the reach. To override this limitation it is tempting for researchers to use the non-probability sampling technique of snowballing (Browne, 2005), whereby existing study subjects (in this case the researcher's social media 'friends') recruit future subjects from among their acquaintances. Naturally, any such sampling technique which relies on interpersonal relations and connections between people will necessarily include and exclude individuals, with implications which may or may not have a bearing on the conclusions which can be drawn (Browne, 2005).

Central to any successful research project involving human participants is the quality of the relationship between the researcher(s) and their participants (Kara et al., 2020). Online research using social media channels can remove the personal aspect of face-to-face or telephone interviews, so when choosing to use social media in research, alternative steps must be taken to ensure an informed decision to contribute has been made by participants. Sharing surveys online, for example, can diffuse the immediacy of the connection between participant and researcher (Lee, 2017) and also promote a lack of trust from the perspective of the participant, who may become unsure for whom they are answering questions. In her paper on the ethical pros and cons of using 'friends' in a study recruiting participants via a social media platform, Lee (2017) suggests that with this uncertainty participant engagement could likely be affected, or even terminated. This concern is highly relevant to some of our international student researchers who may be unfamiliar with local organisations and have few established networks. The default then becomes their fellow international students, who may not have the breadth of experience or perspectives being sought. This, therefore, becomes an issue that staff supporting the development and drafting of a proposal are well-placed to raise, and perhaps suggest mitigation strategies.

4. Recruitment

As researchers increasingly turn to using social media to both retrieve available data and recruit participants, there is an ongoing need to keep pace with the ethical implications of both the institution's research expectations and the social media channel utilised (Bode et al., 2020). In Bode et al.'s discussion of study designs in social science research using social media, the authors clearly outline potential areas of compromised data:

> there are restrictions … in various institutions on what type of social media can be accessed. Thus, the data that are available from social media are more akin to a sample of the data than representing the full potential of the data. This sample … may contain a bias with regard to the type of information available for the researcher to make inferences to the population to which they would like to generalise. (p. 17)

With this in mind, the collection of additional data through means *other than* social media channels may need to be carried out to address potential biases. There may be challenges around validity and reliability when using social media as a research tool (see the earlier point about snowball sampling); careful research design, clear research aims and an appropriate selection of analytical tools must therefore override simple expediency.

5. Public or private?

Because social media sites may be both intimate and public (Lee, 2017), gaining participant consent and ensuring privacy and anonymity can be difficult. Social media users often unwittingly sign up to various platforms without reading the fine print, unaware that the act of creating a password and login implies consent. Academic researchers must be both aware and respectful of this. While it may be tempting to access 'big data' from public sites, simply 'lifting' detailed, personal information, opinions and other large sets of data must still be done ethically. Sites where you need to use a password, be registered or be a current member of an organisation are clearly 'private,' and data should not be used without permission – by the social media site owner and/or the individual(s) who provided it (Browne, 2005; Lee, 2017).

Experienced academic researchers are likely aware of the possible traps of using unconsented data, though novice researchers may not be. In general, if data can be accessed without site membership or registration, such data can be considered as public domain. If a social media platform is copyrighted, meaning the proprietors legally own the data, consent will be required to use this for research purposes – but this issue is often addressed in the 'small print' clauses that people agree to when they create a login to the site, including information about how membership might apply to an intended use of content (Golder et al., 2017).

6. Participant privacy and anonymity

Because the researcher and participant are distanced by the complexities of cyberspace, it is difficult to know whether social media users see online spaces as 'private' or 'public,' or whether these potential participants would be happy with their input being used for research purposes. Researchers using online data are not usually privy to this information, so that even when users have been happy for their comments to be identified by name and/or profile, it is good practice to keep individual identities private. When using social media for harvesting data, it is important to realise that the privacy setting controls available on many social networking platforms may in fact be affecting the data being retrieved. These settings allow users to limit who can access their profile and the information visitors can see, as well as limiting the option to engage with an 'outside source' such as a survey link (Di Minin et al., 2021). Any research which draws on private data requires explicit informed consent from the user, as well as the site owner; however, if the information is available on open profiles on the likes of Facebook, TripAdvisor and LinkedIn, it can be freely accessed and treated as any other open-source information found online (Skold & Feldman, 2014). Nonetheless, without informed consent, most commentators advocate strongly that individual contributions, especially as examples, cases and direct quotations, are anonymised and/or aggregated (Stevens et al., 2015).

Some take this position further, asking whether individuals who have posted messages to the internet can really be considered 'participants' in research; or rather, is the use of their comments more like the analysis of secondary data that already exists in the public domain? (Hennell et al., 2019). There are academic arguments in the literature to support each interpretation, but many professional authorities and universities require ethical approval – which will usually include evidence of informed consent.

7. Participant consent

The precept of informed consent requires that individuals have explicitly agreed to be participants in a research project and understand its purpose and scope, including their right to withdraw (Hennell et al., 2019). This also contributes to establishing trust between the researcher and the participant, as the participant will understand what their involvement will be, what the research is about, where and how it will be used and who will benefit. For research involving large datasets, individual informed consent is not practical. Researchers must therefore ensure that data use is in line with the terms and conditions of the social media platform they are using to gather data and, again, ensure that the identity of users is protected (Social Media Research Group, 2016).

As with face-to-face research, good practice usually involves producing a participant information sheet, which can be signed and returned, or a separate consent form – rather than relying on oral communication and assumed understandings. To ensure integrity and transparency of purpose, official affiliations such as the researcher's institution's name, web link, email and contact details of a manager or supervisor should be included. Being explicit about security and privacy terms is expected, as is explaining how the potential participant's contact was obtained (for example, via a search of TripAdvisor or Facebook for public profiles), and what demographic filters were used. A final recommendation is to include assurance that participants will have access to the research findings once the project has concluded, as well as how this will be achieved (Hennell et al., 2019).

Once consent has been given through approved methods, the academic researcher may then collect data online through individual interviews, or group discussions in dedicated chat rooms, using video conferencing software (for example, Skype, Zoom). Survey links can be posted on the platform or sent to email addresses. Researchers can also use 'naturally occurring' or organic real-time data (textual, photographic and video).

Figure 1 summarises key directives arising from the above discussions related to the use of data sourced from social media for research.

Informed consent is necessary	• Because it is morally and legally required • To promote trust between the researcher and the participant • To quote a username alongside a post • If a post is not recent, to confirm that the user has not changed their opinion since • To publish photos/images • If the post is considered sensitive/personal • To confirm if the user intended to post publicly • For users to determine the quality and purpose of the research • For participants to interact with the researcher
Anonymity is needed	• If informed consent cannot be gained • To avoid harm – for example, judgment, ridicule, singling out • To preserve and/or protect an individual's professional reputation
Consent and anonymity are deemed unnecessary	• If the online platform carries a clearly visible statement that responsibility for shared content lies with the user – they can choose where, what and how privately to post • If the site owners have made it very clear how public posts are, and who can see them.

Figure 1. The obligation to observe informed consent and anonymity (Adapted from Benninger et al., 2014, p. 25).

CONCLUSION

Social media research – any form of research using data derived from social media sources – clearly contains both advantages and potential pitfalls for academic researchers. Against the pluses of easy access to large datasets, researcher-convenience and substantive savings in time and resources, academic researchers must acknowledge concerns related to bias, credibility, validity and representation. Further, most, if not all the standard ethical imperatives of traditional research involving human participants apply equally to online methodologies (Townsend

& Wallace, 2016). Often, novice researchers, especially our students, may only know of such requirements from class, and fail to see the connection with their own use of data when they have not gathered these firsthand. This is where learning and research support staff have an important role, raising questions, prompting critical reflection and facilitating strategies and solutions.

This paper has attempted to provide an overview of crucial areas of interest in preparing a robust academic research application, whether one's own or one belonging to others whose learning we support. Researchers will need to be academics first and members of online communities second, and guard against assumptions and complacency due to familiarity with various social media platforms, resisting beguilement by the ease with which data can be extracted. They must comply with legal requirements – the national legislative framework and the site owners' terms and conditions. Individual identities must be protected, and when the site is being used to recruit participants specifically for a new project, the full gamut of informed consent requirements must be enacted.

Social media use is growing, as is the number of hours people spend online and the different platforms they can choose from; the work-from-home reality for large numbers of our population which arrived with COVID-19 has only hastened this spread. Academia is not, nor should it be, isolated from our digital world. As educators, we prepare our learners for the workplace of tomorrow. Smart, critical and informed use of social media for academic research is just another skillset that falls within our aegis.

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TEACHER AS LEARNER: USING SEA-LEVEL RISE TO COMMUNICATE THE SERIOUSNESS OF CLIMATE CHANGE

Edgar Burns

INTRODUCTION

This article reflects on one effort to better communicate the seriousness of how global climate change will impact New Zealand society (McKenzie, 2022). The article excavates the author's own learning as an educator over the last decade. In a social context where scientific information and public discourse about climate heating continue to change, both the content of and approach to teaching have had to be continually revised to meet the needs of students and other learners. Climate concerns have been politicised and denied by vested interests for decades (Garrett, 2017; Leonard, 2019). Moreover, most manifestations of climate change are hard-to-see, almost unimaginable, amorphous problems, that are difficult for ordinary members of the community to 'get' (Norgaard, 2011).

Even clear communications like Al Gore's (2018) *An Inconvenient Truth* or Naomi Klein's (2017) *This Changes Everything* have yet to shift governmental and business behaviour. The graph-lines of atmospheric CO_2 and temperature rise continue steeply upwards. The diffuse elements of enormous scale, long timespans and the local limits of human observation, where people live and act, make it hard for people to register just how serious climate change is. Motivating new environmental, recycling and other mitigating practices are all parts of the solution to our enormous planetary social problem. It is difficult, however, to create motivation for such broad conditions, circumstances for which action does not make an immediately observable difference.

Motivational models derived from individualistic forms of psychology are relatively ineffective in securing understanding and buy-in from more than a small proportion of society. For the rest of us, the discursive force of public opinion is a more powerful motivator, especially for middle adopters and laggard adopters resisting the serious importance of climate change. Government regulation and encouragement in participating in public discourse about the urgency of social change is becoming more central as each day goes by (Blennow & Persson, 2009). In motivational terms, for tackling complex social problems an alternative way to think of environmental motivation for the bulk of the population is *after the fact*. Acquiring an electric car, actively recycling household waste or planting a farm gully has those involved much more articulate *afterwards* on the benefits or moral desirability of what they have just achieved.

Discourse as headwind or tailwind?

Teaching or communicating always happens within prevailing discourse (Christoff, 2013). An idea or opinion is not just a molecule of information or evidence by itself. A fact is always a fact within a context, viewed and motivating (or not) from one perspective or another, perhaps from a place of privilege, Western-ness, gender or race, perhaps from the vantage point of the 'one percent' or from a particular political position. Further, facts are interpreted *against* other interpretations (Garrett, 2017). Like other strategies that de-valorise the views of women or Māori, getting environmental and climate change facts moving is not simply a matter of stating clearly

and compellingly different information and the need to change (Van Den Berg et al., 2022). Before articulating the need for change – since this cannot be done simply by asserting truth or reality – ways have to be found to cut through, at least to some extent, the current dominant voices in the conversation, so new information gets an opportunity to be heard (Kline, 2021).

BACKGROUND AND CONTEXT

Within my regular practice of pedagogical analysis of tertiary education, I have found that some writing reflects on the teaching craft more particularly (Kaufman & Schoepflin, 2009). Recent examples include Burns (2016, 2017, 2018, 2020a, 2020b). Reflection usually involves reporting on experiences and lessons learned as a teacher in relation to theorising how better to assist students to understand a concept or principle drawn from academic or professional literature, or considering empirical teaching circumstances. In this discussion, that broad personal agenda continues, albeit incorporating two contrasts from previous writing. First, the content here is about environmental change rather than gender, ethnicity, spreadsheet use, mentoring or research methodologies. Second, in my current role, sometimes with students and sometimes with local and rural constituencies, my orientation is communicating core climate and environmental ideas in as simple terms as possible, in both classroom and community.

The present article reflects on the pedagogical problem of communicating climate change and on personal progress to date in this area, feeling that there is much more to do. In creating an active pedagogy that reaches beyond the science and the need to change politics, Kopp (2021) observed recently:

> At the most basic level, the facts about climate change have been clear for a long time, with the evidence just continuing to grow. As a result of human activities, the planet is changing at a rate unprecedented for at least thousands of years. These changes are affecting every area of the planet.

Such confirmed and inarguable evidence, matched by little realistic action, is a problem addressed explicitly by a group of scientists and planners: it is not the science, nor is it the general population's lack of will that is at fault. Glavovic, Smith and White (2021) see a popular disconnection with the science, even though "Governments concur that the science is settled on the reality of climate change" (p. 2). For this reason these authors propose a moratorium on science research, arguing that "the tragedy of climate change science" (p. 3) is the failure of governments to act on the social contract between science providing the information and government taking requisite actions on behalf of the population. Their second option (between science-as-usual and objecting to more science research) is:

> intensified social science research and advocacy on climate change. It focuses on better understanding why action has not occurred, and how to enable the behavioural and institutional changes required to contain global warming and climate change impacts. To date, funding has been dominated by the natural and technical sciences. … We recognize that in recent decades much more work is being done in this realm by political scientists, sociologists, economists, human geographers and the like, and this has exposed the powers and vested interests that have impeded climate action …. In parallel there has been a recognition among both scientists and the public of the need for increased advocacy by the scientific community. (pp. 2–3)

Sadly, almost despairingly, they continue:

> However, even with more social science research, scientific advocacy and significant support from civil society, there have been no signs of systemic change in government action. There

> is no evidence that more social science research and traditional forms of advocacy will lead to transformative action within the timeframes required to avert dire climate change consequences. (pp. 3–4)

In summary, they acknowledge that in light of the urgency of climate change this "second option is therefore also not tenable." These authors advocate choosing a more intransigent third option, namely rejecting doing more science, asserting that further money spent is wasted since the science is clear – "unequivocal" in the phrasing of IPCC6 (Kopp, 2021).

In supporting such grave concerns as Glavovic, Smith and White express, my own interest in sea-level rise provides one important bridge for talking in everyday terms to a range of student and non-student audiences.

SEA-LEVEL RISE AS A 'HEARABLE' TOPIC

Talking about sea level seems to avoid trigger words and the retreat from technical and academic language. Even today, the phrase "climate change" can elicit reaction or resistance. Important terms like "anthropogenic," which are becoming central in policy discourse, can leave individuals behind, missing the personal consequences needing their attention and action. Even words like "biodiversity," which have become part-and-parcel of environmental discussions about bush, forests, farming or urban environments, are technical terms that ordinary folk do not use or immediately understand (Myerson & Rydin, 2006). Overused terms like "sustainability" become susceptible to green-washing, plus a more critical challenge – do we seriously want to *sustain* an already degraded environment? Each part of climate change – heating, CO_2 emissions, sea-level rise, biodiversity loss, land and water degradation, plastic and chemical contamination – is, of course, interlinked with others in multiple ways.

How can we open the conversation to help people appreciate the seriousness and urgency of what humanity is facing? My search for ways to better communicate climate change continues to build year by year. Figure 1 and the chronological discussion that follows describe my personal learning progress about sea-level rise and the need to alert learners to the seriousness of climate change.

Year	Process	Substance
2015	Teaching sociology	Climate denialism, environment – society link
2016	Conference paper	SLR – impacting Australian university campuses
2017	Finding articles	Demystifying the science for non-scientists
2018	Finding articles	Sea-level measurements – updated studies
2019	Finding articles	Shifting to a new research environment
2020	Presentations	Regen ag, soil, erosion; people in community
2021	Poem; Teaching geography	First-year subject, "Environment and Society"
2022	Using hands to show SLR	Science/human impacts; latest IPCC6 report

Figure 1. Understanding sea-level rise (SLR) to teach environmental and climate change.

Any complex learning process contains threaded chronologies of learning: partial insights, going back and re-learning, as well as learning something new about what was previously known, connecting this to additional information, or ways that ideas might be applied. All of us need to learn about the dire climate circumstances we and our descendants are now living in.

2011–2015: SEA-LEVEL RISE AND SOCIETY

Over the last decade I have taught into a large first-year Introduction to Sociology course in Australia. All three editions of the textbook used over that time included a final chapter on society and the environment. That chapter was written by a sociologist practicing his environmental commitment through annual trips to help a small Indian village. But environment was only an adjunct to the serious topics of work, leisure, gender, ethnicity, technology and similar. Sociologists were then beginning to critique their discipline's lack of engagement with the environment and climate change (Lever-Tracy, 2010; Urry, 2010).

Teaching in both Australia and New Zealand has created connections between race and climate activity; about working with nature, rather than unilaterally imposing our human will on it; about including humans within nature, not endlessly exploiting it. While climate change is indeed apocalyptic in planetary terms, Indigenous scholars understand that as humans they are part of nature, and need to respect nature. But Western knowledge about looming climate disaster may not help deepen understanding of the problem (Davidson & Da Silva, 2021). After all, whose apocalypse are we talking about? Whose actions are causing the problem? Congruent with this critique, it may be that talking about sea-level rise better focuses on what the facts mean, since most people think climate change is about science.

Another personal influence in this period was Hurricane Sandy's damaging impact on New York in October 2012. Commentators described how a small rise in sea level created very much larger surges that could encroach on places and people beyond the reach of higher water levels as conventionally understood (McInnes, Hemer & Hoeke, 2016). Every so often, I read yet another scientific journal article updating information about sea-level rise from glacial or Arctic melting caused by climate heating.

2016: THE RISE AND RISE OF SEA LEVEL

Students seemed to find sea-level rise the least controversial part of climate change discussions – despite being factual, historically documented and implying obvious consequences for society. At this time, I found myself fascinated by online interactive global maps that allowed clicking on different levels of sea-level rise to show what would happen to major coastal cities that most students knew by name. An example of such a map is the "Sea-Level Rise Viewer" (https://coast.noaa.gov/slr/#/layer/slr0) in which any world city or region can be viewed to see these changes by selecting a range of SLR expressed in feet or metres.

Working with an outstanding Honours student, I prepared a paper for the Australian Sociological Association conference, assembling a series of maps for our presentation from the interactive sea-level rise map tool (Burns & Ireland, 2016). We chose the example of Australian coastal metropolitan university campuses. Many of these campuses are located close to sea level. My own campus several kilometres inland seemed relatively safe, but Melbourne, Victoria and Monash universities would have potential problems. The concept was simple, the results followed the science, and the results were alarming. Why had those sea-level rise websites bothered to include several-metre rise options to interact with? Certainly, while this was not the virtual game Sim City™, clicking sea-level rise amounts meant inundating cities and coasts, being godlike for a moment. We imagined ourselves speaking to university campus property managers who plan decades or even longer timescales ahead, deciding where multi-million-dollar investments in university buildings should be made.

2017–2020: MORE KNOWLEDGE, MORE WAYS OF SAYING IT

Shortly after this, I was invited to give the social science lecture in an Environment and Society subject taught out of a science faculty. The social and human aspects were peripheral to the personal focus and sense of expertise of the ecology lecturers on the course. I read voraciously around then-current science, feeling I was being put on

my mettle in front of 'real' scientists. The subject co-coordinators asked me could they sit in to listen to a social science perspective, and afterwards in the debriefing they seemed surprised at how I had spoken plainly about how sea-level rise and other data points would very seriously impact people and populations. I learned about the tensions surrounding science neutrality – "just the facts" – that often hold scientists in thrall, over against the importance of getting the point of the science across to people in society.

The article by Hansen et al. (2015) which I read at this time illustrated the crossover between social science and the clear social message of at least some biophysical and climate scientists: ice melting, glaciers retreating, more extreme storms and sea surges, hotter temperatures causing ocean expansion and encroaching coastlines. These authors explained the evidence and the historical record of our modern centuries was graphed simply and clearly – there is only one way that sea-level rise is heading. More than that, however, their sense of urgently needing to speak plainly impressed me. Reading Friedman's (2010) folksy analysis further sharpened my understanding: Mother Nature is neither threatened nor offended by human environmental over-reach, but she is not impressed either, always simply following the physics, biology and chemistry.

Other examples of my reading about the science of sea-level rise, like DeConto and Pollard's (2016) analysis of past and projected influences on polar melting, widened my science knowledge. I read with the aim of enhancing my social science understanding, including Chapman, Lickel and Markowitz (2017) on the role of human emotion in deepening understanding and commitment to change. Each year I practiced different ways of saying what I was learning. In the early years of the decade students off farms would respond in class with statements like, "My Dad doesn't believe in climate change," but by mid-decade such responses had ceased.

2021: CLIMATE SADNESS, THE POEM

Attending a conference in Cambodia, I found myself marvelling at oceans of rice fields and the amazing hydrology of Tonlé Sap, the large lake–river system at the centre of the country and the economy, which will be obliterated by any significant rise in sea-level. I wrote a poem called "Climate Sadness" as a new way to communicate sea-level rise – bringing the human emotional impact of climate change together with the science (Burns, 2021, p. 1):

> The poem is sad for Tonlé Sap, for Cambodia, and implicitly for all of us on this planet. For thousands of years people have lived around Tonlé Sap, adapting to weather, the flow of water from mountain to sea, and the changing ebb and flow of civilizations. Anthropogenic sea-level rise challenges all of this human history, unnecessarily.

This statement reflected my feelings visiting Tonlé Sap that something more than academic analysis and discussion was needed – rather, something visceral and human – to communicate the seriousness of climate change.

At a recent public presentation to an informed but non-specialist audience, I found myself locating the importance of regenerative agriculture within the context of global climate change. How much longer would the oceans be a sink for carbon? As global heating and sea-level rise continue, oceans lose their capacity to hold carbon, releasing large amounts of CO_2 and triggering yet further rounds of heating and then even further sea-level rise. How to get that across? Going back to my science reading over several years, I found that the exact quantification of sea-level rise in millimetres is readily available (NASA, 2021; see Figure 2). The width of my left-hand fingers and thumb represented sea-level rise across the twentieth century – my audience's parents' and grandparents' lifetimes (nearly 100mm). The width of my right hand and thumb represented sea-level rise in the last 25 years (over 100mm) – accelerating in our own lifetime. I said, "You mightn't be able to see it, but that's what's happened." Short, clear, summative of the science, and personal.

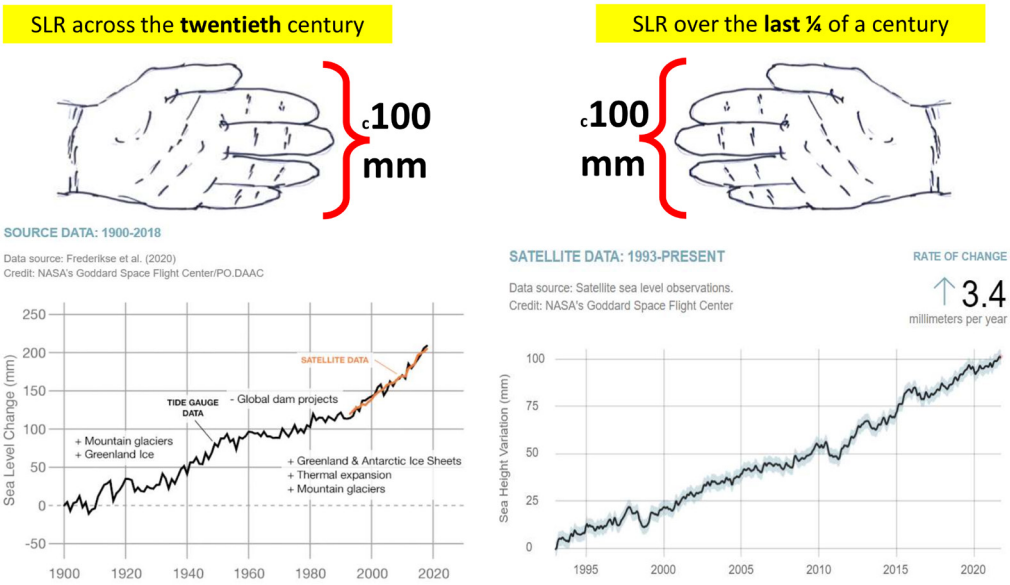

Figure 2. Visualising NASA (2021) sea-level rise data in human terms.

A new undergraduate geography class, Environment and Society, necessitated updating references, joining the science and the human implications, looking at questions of inclusion, looming climate impacts, and theorising climate "non-change" (Wörlen, 2011). The same demonstration of sea-level rise as shown in Figure 2, waving my arms about, led a mostly younger audience to discussing climate change speeding up and potential step-changes to a much greater rise in sea level, since hotter temperatures could lead to sudden, massive ice-melt events. How can we shift from fatalism, or ignoring the problem, to action?

2022

Wider climate change concerns can be concretised and made real, even though sea-level rise, too, occurs at planetary scale and the millimetres cannot be seen in daily or yearly changes. Drawing on his IPCC6 involvement, Kopp (2021) refers to sea-level rise:

> Global sea level has been rising at an accelerating rate since about 1970 … two main factors … the melting of ice in mountain glaciers and at the poles, and the expansion of water in the ocean as it takes up heat. … Sea-level rise is leading to substantial impacts on coastal communities, including a near-doubling in the frequency of coastal flooding since the 1960s in many sites around the world.

On relevant occasions I introduce news stories raising sea-level rise issues to anchor discussion. For example, McGregor (2021, n. p.) describes recent coastal flooding across Pacific island countries, creating "widespread damage to buildings and food crops":

> In a terrifying glimpse of things to come, this current La Niña is raising sea levels by 15-20 centimetres in some western Pacific regions – the same sea level rise projected to occur globally by 2050, regardless of how much we cut global emissions between now and then.

I find myself re-working this point for audiences to counter over-hyping the current 2050 zero-carbon emission policy buzz that can be nothing more than an intermediate goal, given the continuing momentum of global heating and sea-level rise.

This year's class has been re-badged from Environment and Society to A Planet Under Pressure. One of my slides in the final class was a screenshot of Aschwanden et al.'s (2019) abstract, the opening sentence of which reads, "The Greenland ice sheet holds 7.2 metres of sea level equivalent and in recent decades, rising temperatures have led to accelerated mass loss." I dramatised our class discussion of sea-level rise flooding coastal cities by heading the slide "One horse of the apocalypse." I will need more hand-widths of visual imagery in future classes.

Today, global and national science strategies explicitly attend to the consequences of CO_2 for planetary heating, which in turn impacts oceans, with consequential effects for human populations (NASEM, 2021). The current calculation of NASA (2021) shown in Figure 2 is a 3.4mm sea-level rise per year and accelerating. In those commentators displaying an over-abundance of caution (for example, Kopp cited above), it is rare to read what this means for the world's coastal cities: this small figure implies a one-metre rise in the next 30 years, even before an increasing rate of acceleration, or sudden melt event, is included.

CONCLUSION

Experienced educators treasure their accumulation of learning plans and teaching examples. Here, however, new evidence, new graphs, and new implications of climate change necessitate accelerated teacher learning and further development. Discussing sea-level rise engages attention without triggering negative reactions. It makes learning more personal and real, not simply cognitive. It also makes visible the existential threat facing humanity. In this field, the educator's moral imperative is to find ways to communicate the climate message against indifference, naysaying or organised interests. It means bringing the appropriate factual and verifiable science to those yet to appreciate that the science is settled and rock-solid, and that the growing climate-change momentum disfavouring the human species is potentially catastrophic.

The twists and turns of experience, chance meetings, events and the reactions of those listening are all part of educators' continued learning of their professional craft. Learning about sea-level rise has been a cumulative journey to find a 'hearable' message that will convey the seriousness of climate change. Ideals of service and learning, 'turning lights on' in the routines of semester cycles, meetings and seminars are all foundational for expressing such major imperatives for society today.

Edgar Burns has taught in the polytechnic and university tertiary sectors for more than 25 years. He takes an interdisciplinary approach, starting from his core sociology teaching and research roles. In his present role, influencing attitudes to environment and climate are priorities. His recent book, *Theorising Professions: A Sociological Introduction,* was published with Palgrave Macmillan.

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PROJECT-BASED LEARNING VIA STRATEGIC OBJECTIVES FOR SUSTAINABLE PRACTICE

Marianne Cherrington, Jun Sugita and Christiaan Bredenkamp

INTRODUCTION

Otago Polytechnic (OP) has long had a focus on sustainability and uses the United Nations Sustainable Development Goals (UN SDGs) as our sustainability framework (United Nations, 2021). The polytechnic aims to embed sustainability in all that we do (Matthews, 2014). Our Sustainable Practice Strategic Framework supports the development of students as sustainable practitioners and graduates who are sought after in the labour market (Otago Polytechnic, 2013).

Joint postgraduate and undergraduate applied management classes at Otago Polytechnic Auckland International Campus (OPAIC) used experiential learning and workshopping to create a project-based learning product underpinned by back-casting sessions.

This report is based on research from an internship project focused on campus sustainability initiatives at OPAIC. The work-based learning project investigated sustainable practice, chiefly in an applied management undergraduate paper, from a student experiential learning perspective in Term 1, 2022. Key insights and findings are discussed and summarised here.

The research asked the question, how can experiential learning activities advance the progression of sustainable initiatives at OPAIC campus? Four simple, open-ended questions were used to analyse student perceptions relating to the research question, with an aim of continuous, quality improvement towards delivery in subsequent terms. A Learning and Teaching template was used to embed sustainability and experiential learning for international students. Three workshop types are reviewed in this paper: Wānanga Kairangahau (WK), Sustainability Industry Open Day (SIOD) and Campus Sustainability Workshops (CSW).

Fundamental to the project was the re-examination of what our Strategic Objectives for Sustainable Practice (SOSP) (Mann, 2011) mean contextually for the campus, in terms of climate action in a "new world of work" (Schwarz, 2021). These strategic objectives form an actionable foundation for sustainability initiatives on campus and mandate OPAIC:

- to develop sustainable practitioners
- to model evidence-based sustainable practice in our operations
- to encourage communities and businesses to embed sustainable practice
- to ensure that our actions benefit our communities.

An intensive effort to re-activate the Strategic Objectives for Sustainable Practice on campus in 2021 actuated seven different campus sustainability initiatives in each of five blocks. The year culminated with OPAIC joining the Green Office Movement, the first tertiary campus in New Zealand to do so. Already in 2022, more students

are involved in sustainability on our campus; focused work on campus sustainability projects is underway. Seven campus sustainability initiatives are developing sustainable practitioner capability to instigate student climate action on campus.

Climate action is now an imperative for organisations (Naviza et al., 2021). Our OPAIC campus is home to both international students and staff; it is as almost as diverse as Auckland itself. Our joint applied management cohort examined what sustainable practice means in a campus whose vision is "to develop New Zealand's most employable graduates" (Otago Polytechnic Auckland International Campus, 2022) via student discussion, reflection and reflexivity.

Students created a novel project-based learning product, deciding to advance all four Strategic Objectives for Sustainable Practice as a linear process, using tools of continual improvement. The intention is that students and staff evolve as sustainable practitioners in any field of study in their learning journey. Students can leverage structured, student-centred learning and teaching opportunities which blur the lines of work and teaching and learning. The processes created can empower students as capable sustainable practitioners in chosen fields, adding value to organisations, businesses and communities.

PROJECT OVERVIEW

Following two terms of pandemic lockdown at the end of 2021, it transpired that block one of 2022 would also be off-campus, delivered via the Microsoft Teams platform. To make learning engaging and contemporary, a weekly, term-wise system was created, honed and templated for several applied management cohorts, to further embed sustainability in all that we do. The first session each week focused on applied theory, experientially delivered, relevant for the paper. The second session was tutorial-like; topical issues, tools and scholarship were discussed to elevate a culture of contemporary learning. The learning template structure is set out in Figure 1.

1. Karakia / Whakataukī	8. Review and Reflect
2. Calendar / Learning Plan	9. Mahi tahi / Karakia
3. Today in the News	10. Management Tools
4. Applied Management Focus	11. Sustainability / SOSP
5. Topic of the Week	12. Project-based Learning
6. In Communications	13. Homework step-by-step
7. Nascent Research	14. Mātauranga kia Mārama

Figure 1. Refined learning and teaching template: applied management.

Point 11 in the learning and teaching template ensured a focus on sustainability, yet embedded sustainability could be and often was highlighted within any topic in the template. The template has clarified that our campus embeds sustainable practice in learning, for every paper. A dramatic cultural shift has occurred from 2021, when staff and students essentially implied that sustainability was a separate topic or paper. In 2022, students are including sustainability and embedding the concept in their assessment and project work; in fairness, this tends to happen more often where lecturers are 'up to speed' with their own sustainable practice capabilities.

The template also supported constancy and evidentiary communications, with streamlined presentations that entrenched experiential groupwork and diverse perspectives; it could be used to bullet-point student experiential learning insights. Also, an end-of-term product was created by students to reimagine a process of SOSP evolution for any class in any department, by term.

To do 'more with less' and avoid burnout, the 14-point template was honed to deliver contemporary content, lift capabilities and embed sustainability; a basic bicultural focus was instituted. Undergraduate classes utilised the 14 points as weekly content; postgraduate classes supplemented tutorial sessions with the template, contextualising technical topical delivery. At an international campus, a closer alignment to the culture in Aotearoa New Zealand was established. News articles and debate topics were reflected on experientially. Management tools and frameworks were used to embed sustainability in all activities (Matthews, 2014). The Strategic Objectives for Sustainable Practice and their expression were discussed.

Elements of the template were used for Campus Sustainability Workshops (CSW) and vice versa, to reinforce learning. The workshops continued even though teaching was online. Classes were combined in a progression of 'working lunches.' Exclusive events, launches and webinars proved opportune. The Sustainable Business Network was particularly useful, serving to merge many relevant topics for debate and assessment depth and breadth, to support development of sustainable practitioners and operations on our campus. Our innovative project-based learning product encapsulated the learning and teaching. It was similar to a real employment internship.

RESEARCH METHOD

The research question was: how can experiential learning activities advance the progression of sustainable initiatives at OPAIC campus? Four simple, open-ended questions were used for efficacy and perceptive insights. OPAIC uses embedded sustainability in all learning and teaching and has a focus on experiential learning styles and practices. Work-based learning insights were collated and summarised, and three types of workshops are reviewed in this paper.

The research methodology was derived from primary qualitative feedback, collected through query and a series of questionnaires. A cohort of 13 undergraduate and 14 postgraduate applied management students consented to be included in a summative research project on sustainability initiatives. The open-ended questions were purposely simplistic, intended to be refined for efficacy and continual improvement purposes (ethics approval AIC85). Open-ended questions (paraphrased here) simply asked about an initiative: what students liked, what might be improved, what was learned and how initiatives might support their future. Along with experiential learning comment, many insights, commonalities and improvement ideas were collated. Nineteen of 27 students submitted questionnaires, reviewed for perceived efficacy on:

Wānanga Kairangahau – Student Researcher Workshops (WK): hybrid sessions, as a process to support student research co-publication in journals and conferences.

Campus Sustainability Workshops (CSW): hybrid delivery of nascent topics in sustainability, expressly relevant for sustainable practice and recent campus projects.

Sustainability Industry Open Day (SIOD): different from Student Researcher Workshops, as they emphasise embedded sustainability and applied industry-focused research.

The open-ended efficacy questions were based on student value-based perceptions. Students had several days to respond after each initiative. As well, in-depth discussion and debate were fostered, and unusual responses were explored for insight, connection and scaffolded learning that might be attributed to experience or nascent topics in learning via the template (Figure 1).

The feedback on WK, CSW and SIOD initiatives in block one 2022 covered a range of topics, some of which were discussed in class. Experiential exercises were used to reinforce the initiatives and encourage open and diverse comments using reflection and reflexivity frameworks. External organisations such as the Sustainable Business

Network and the Climate Leaders Coalition were studied, with the aim of exploring a bigger, organisational sustainability picture and absorbing more knowledge of sustainable activities outside of the Auckland campus. These initiatives helped to contextualise the need for education with embedded sustainability.

Information was categorised and explored to assess breadth and depth of response. Different approaches could be trialled afterwards for improvement or to transform sustainability on campus. Collaboration and value-added opportunities were of particular interest; the project-based learning product became a value-added output of the learning and teaching process.

Ethical considerations addressed in application AIC85 included anonymity, with non-identifiable personal information; questions were designed as general and improvement-based, with secure storage. The ethics board that approved the research for publication did not identify any potential physical, power-based or emotional risks for adult participants related to the research method.

WĀNANGA KAIRANGAHAU: FEEDBACK AND EXPLORATION

Wānanga Kairangahau – Student Researcher Workshops (WK) began on campus in March 2021 (Cherrington et al., 2021). When OPAIC student research forums were 're-instigated' in 2021, heads of departments invited top student scholars to participate; nevertheless, student research was rarely published, although a campus journal was being mooted. To address this gap, a few senior researchers handpicked excellent student scholars to trial a process-led series of workshops, aimed at turning assessment research into journal publication. The process was iterated and honed within and between term blocks as calls for papers were released. By the end of 2021, a perfected process was delivered as in-class workshops to elevate assessment research generally and to engage top student researchers to publish in the future.

An alumnus, employed in our student success team, delivered Wānanga Kairangahau – Student Researcher Workshops as four one-hour lunchtime sessions; the principal lecturer with responsibility for sustainability competency leadership for OPAIC was supervising lecturer and naturally encouraged sustainability research. It was evident that a warm rapport was created and a 'safe place' for discussion was a highlight of each session. The sessions helped students to embed sustainability and critical thinking in their research; capability is needed to identify disinformation and fake news sources (Morton, 2022; Pace et al., 2020). The student researcher workshops are used as a way of leveraging our Strategic Objectives for Sustainable Practice, especially SOSP 1: to develop sustainable practitioners; each paper has sustainability embedded in it, evident in assessment research as publishable material.

Insightful comments regarding research and Wānanga Kairangahau noted that the sessions:

- reinforced scaffolded learning, notably building on capability for sustainable practice
- detailed how to improve research generally and how to improve report-writing skills
- accomplished more with assessment research, as research should have clear goals
- focused on applied research, where conclusions should supply answers (if not, why?)
- were logical, with structure and ready-to-use hints, with definitions for the main terms
- considered the readers and their journey by addressing questions they might have.

A summary of suggested improvements to Wānanga Kairangahau workshops is provided in Figure 2, compiled from students who supplied feedback on the sessions. The percentages are based on the number of comments supplied that were grouped into similar topic categories. The workshops prompted the inaugural OPAIC Advanced Wānanga Kairangahau Workshop on 25 May 2022 (Cherrington et al., 2021b). Guest speakers from research and technology backgrounds supported upcoming student co-publication targets, anticipating OPAIC's

hosting of the Smart Aotearoa, Sustainable Development competition event on 30 November 2022, and publication of OPAIC's *Rere Āwhio: The Journal of Applied Research and Practice*, which had a sustainability focus in submissions this year.

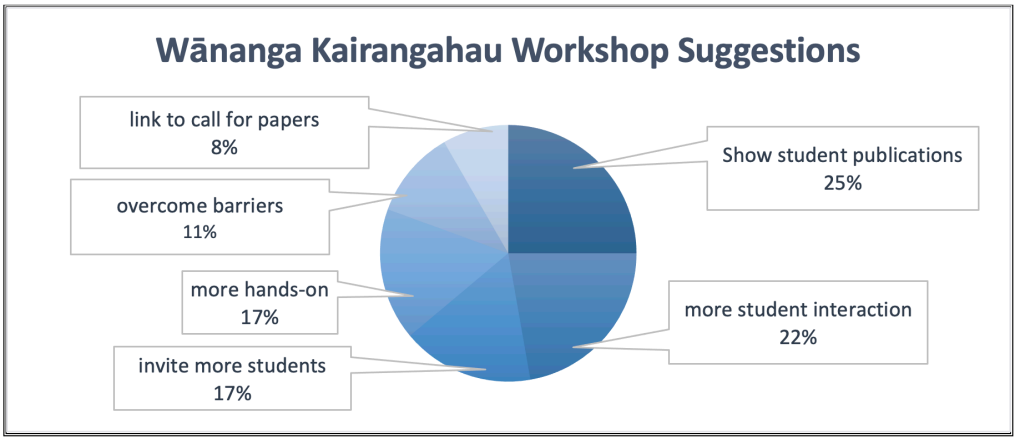

Figure 2. Student suggestions for improving Wānanga Kairangahau Workshops.

The seven campus sustainability initiatives were designed to reinforce each other and leverage capability that was available on campus. Wānanga Kairangahau workshops were not limited to sustainability submissions; rather, sustainability was strongly expressed in our research because of the momentum that the SOSP focus was creating on campus in 2021.

SUSTAINABILITY INITIATIVES: FEEDBACK AND EXPLORATION

Feedback from all three campus sustainability initiatives could be analysed using many valid approaches. This report analyses open-ended responses to campus sustainability initiatives, aligned with the Strategic Objectives for Sustainable Practice and experiential template, and nascent topics (Cherrington, 2020; Zhukov et al., 2022). Insights relate to four questions:

- What are the benefits of creating a culture of sustainability?
- What initiatives should OPAIC undertake to develop sustainable practitioners?
- What are the benefits to OPAIC of membership in the Sustainable Business Network?
- What are the benefits to OPAIC of membership in the Climate Leaders Coalition?

A culture of sustainability was acknowledged by 45 percent of students who supplied feedback on the topic; percentages are based on the number of comments supplied, by simple counts. Note that the groupings are varied and it is fair to say that students are unclear about the phrase "culture of sustainability." Remarks linked a culture of sustainability to strong environmental benefits (Figure 3), and acknowledged its importance in organisations or career pathways (Cherrington et al., 2021c). This result was significant, as feedback came from an applied management cohort. There was conflict as to whether sustainability might reduce or increase costs (greater context is needed to analyse this feedback in the future). The organisational focus and bicultural connection themes were interesting, given that "partnership for the goals" (United Nations, 2021) was a recurring theme in the papers. These themes likely led to the policy/politics comments.

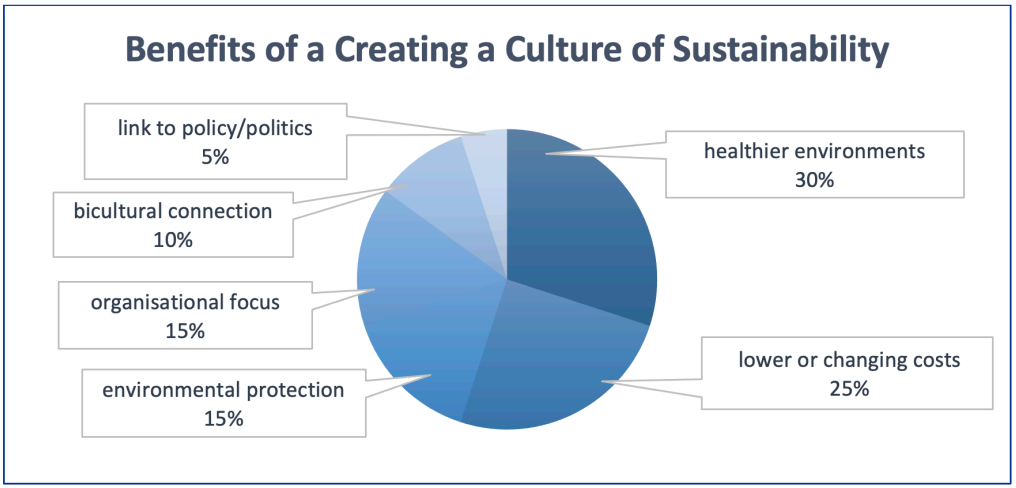

Figure 3. Student perceptions: benefits of creating a culture of sustainability.

Sustainable practitioners could be developed by pursuing OPAIC sustainability initiatives, the students suggested (Figure 4). The link to our strategic objective for sustainable practice was clear; strengthening of sustainability education was indicated in a third of the responses.

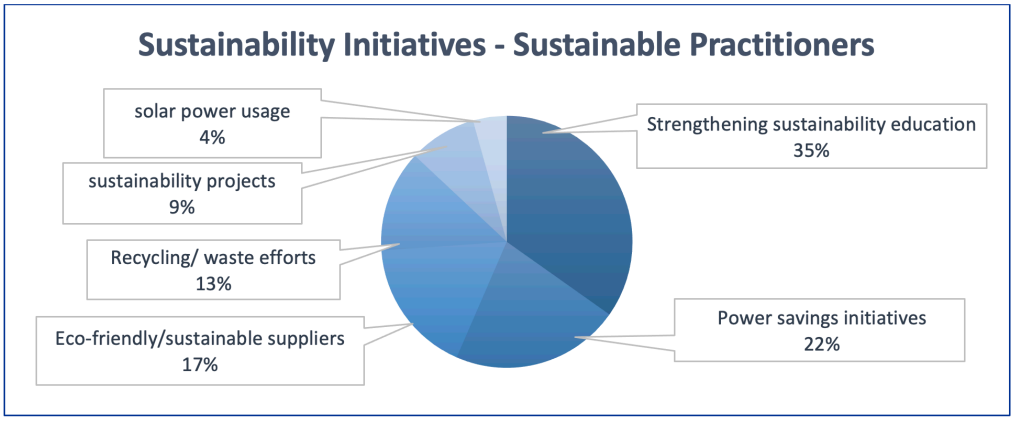

Figure 4. Student suggestions: sustainability initiatives that develop sustainable practitioners.

Tangible initiatives were popular, such as power savings by turning off lights, solar energy usage plus purchasing or supplier choices, which are often given in assessment recommendations. The sustainability initiatives are created and designed to benefit communities.

SUSTAINABILITY NETWORKS: FEEDBACK AND PERCEPTIONS

Students also commented on external networks that were explored via experiential learning sessions. They were referred to repeatedly in feedback comments as various benefits that membership in the networks would present to OPAIC, especially after students watched the IPCC Sixth Assessment Report press conference announcement. Students stated that:

- climate change is not gloom and doom
- the options are clear and the data are clear
- the world has a limited time to move onto the right environmental track
- there is a sense of inertia because policymakers are finally taking note
- implementing sustainability measures can be a game-changer for our environment
- gaps in education are huge in terms of real awareness of the issues
- information and communications can help to turn climate change into climate action.

Sustainable Business Network (SBN) membership is beneficial. Students felt that by joining SBN, OPAIC would align capability and knowledge development in sustainability. OPAIC could lift its reputation with links to business organisations. Students could identify employers with a solid sustainability emphasis (Figure 5) for future job prospects (Oxygen Consulting, 2022).

Participation in Sustainable Business Network events and webinars melds together concepts from the learning and teaching template in an experiential, industry-dynamic way, with pragmatic sustainability challenges that organisations face. SBN provides education and resources for businesses and communities to build sustainable capabilities. For staff keen on updating their knowledge as part of their professional development plans, membership benefits include a reduction in fees and interaction with a plethora of businesses and organisations that readily share their experience and perspectives. Activities are approachable and lead the way, tackling issues relating to Aotearoa New Zealand's climate, waste and environment. Fifty-seven percent of our applied management students were enthusiastic about becoming members of SBN and expected to acquire sustainability knowledge and build sustainability capabilities as a result. A further 29 percent of respondents stated that it would enhance the school's reputation. Another 17 percent connected SBN with business links and the community.

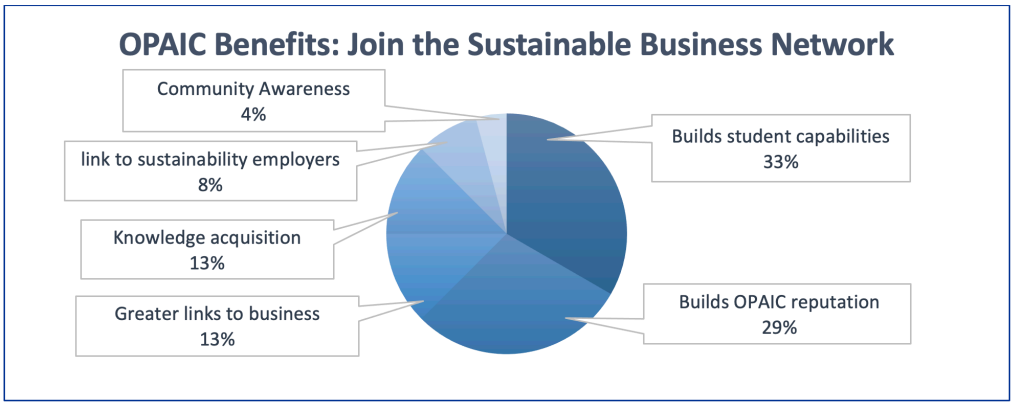

Figure 5. Student-perceived benefits of Sustainable Business Network membership.

Climate Leaders Coalition (CLC) membership benefits were stated by students. Students were likely influenced by the need to reduce emissions meaningfully within organisations to tackle climate change, although the assistance that CLC provided was the leading benefit identified (Figure 6). Definite links to sustainability initiatives on campus were stated (Manate et al., 2021), as well as knowledge about how sustainability is applied in diverse organisations. A greater vision of the benefits could be identified with the focus on partnership, emission reduction and novel methods connected to the circular economy.

Participation in and commitment to the Climate Leaders Coalition tenets are key; member organisations send a public signal that they are dedicated to climate action and are meeting minimum commitments. The CLC is on a mission to reduce emissions. They share information and case studies and lobby for change, government investment and climate action with zero-carbon responsive initiatives.

One hundred percent of the students wanted OPAIC to commit to CLC membership; no one objected to it. Students felt that by joining the coalition, OPAIC would work alongside businesses to achieve zero carbon aims. As with the Sustainable Business Network, there was a stated desire to expand OPAIC's sustainability activities, with interest in Green Office Toitū, events, webinars and presentations (Bredenkamp et al., 2022).

Some students noted that designing out waste supported a circular economy and minimised the use of new resources without wasting resources. As a result, greenhouse gas emissions would reduce significantly, a countermeasure that draws a lot of attention worldwide. Student shared ideas in discussions where ideas were actively exchanged, much as the CLC does.

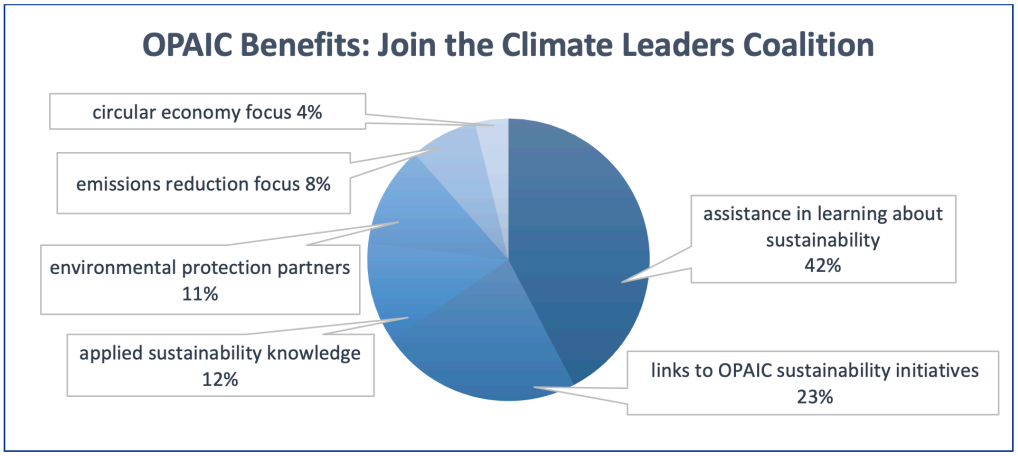

Figure 6. Student-perceived benefits of Climate Leaders Coalition membership.

LEARNING AND TEACHING VIA PROJECT-BASED LEARNING PRODUCTS

The learning and teaching template is designed for collaborative learning; experiential tasks are routinely worked through collectively during "topic of the week," "mahi tahi" and project-based learning slides. While examining the meaning of the Strategic Objectives for Sustainable Practice (SOSP) in the context of our OPAIC campus, students were asked to use groupwork to create a project-based learning product. This was underpinned by a back-casting session in which students envisioned a future state that could be achieved using step-wise progress.

Students decided that all four SOSPs could be advanced as a linear process, using continual, iterative improvement such as plan-do-check-act (PDCA) (Deming, 2018). In this way, the proprietary product, with all the work that underpinned it, could be given to new cohorts of students at OPAIC to support their development as sustainable practitioners in any field of study. A student-based learning product could be a game-changer (Siren et al., 2022), empowering students to be capable sustainable practitioners, adding value to organisations, businesses and communities.

It was felt that the Strategic Objectives for Sustainable Practice already formed a natural progression, especially because each paper in applied management had sustainability embedded in it or had a sustainability context that could be exploited to build sustainable practitioners within various qualifications. The project-based learning product paraphrased the SOSP as a linear process; it could be augmented or developed contextually within any other paper as an experiential learning and teaching tool (Figure 7), or could be delivered as a student-centred learning and teaching workshop (Ganeshan et al., 2021). Bullet points highlighted first steps in progressing back-casting ideas (Delaney, 2015). Contentiously, the students rephrased the SOSP from their own perspectives and understanding.

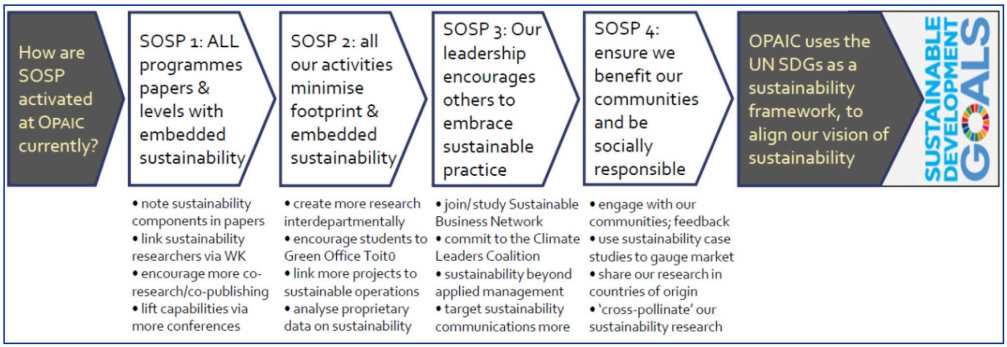

Figure 7. Project-based learning product: SOSP contextualised as a backcasted, bullet-point process.

The project-based learning product encapsulated eight weeks of learning in block one, 2022; it could be activated and progressed by any cohort in the next block. It could be taught via student-centred learning and teaching experiential exercises. Students commented that project-based learning (PBL) created an "optimal learning environment" and "enabled them to deepen their knowledge and understanding" with embedded sustainability. It was felt that PBL utilised student interaction to address multiple needs in a holistic way.

CONCLUSIONS AND FUTURE-BASED RESEARCH

The recontextualising of our Strategic Objectives for Sustainable Practice in 2022 emphasises how critical it is to overcome the climate crisis with climate action based on learning, knowledge sharing and strategies to work sustainably. Learning about sustainable practices through the Sustainable Business Network will improve the capabilities of students, which in turn will enhance the reputation of the OPAIC. Commitment to the Climate Leaders Coalition will require student involvement in measuring, monitoring and mitigating emissions. A greater focus on sustainable operations will be activated in the institution. Being part of these larger networks will attract more students interested in sustainable practices to OPAIC, which will further accelerate sustainable development. Participation in SBN and CLC can also bring marketing advantages to OPAIC, allowing it to use sustainable practices as its selling point.

Sustainable development will soon transform businesses, strengthen the economy and protect our planet. Many more organisations and communities will be involved. It is crucial for OPAIC to showcase all that we do experientially with students via events, webinars and initiatives. Climate action is empowering and vital to overall wellbeing. A greater commitment to sharing our work and communicating our sustainability initiatives and research will ensure that our activities benefit our communities and the world we work and live in. The commitments undertaken by Otago Polytechnic Auckland International Campus can build our reputation for sustainable development and will lead to a positive chain reaction of people becoming even more interested in sustainability and more capable as sustainable practitioners.

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IT'S MUDDY WORK: A SUMMER SCHOLARSHIP RESEARCH PROJECT INVESTIGATING ESTUARY HABITAT HEALTH

David Culliford and Amohia Peka

INTRODUCTION

For students studying physical sciences, research experience and know-how are important attributes to ensure success in subsequent postgraduate qualifications, and are also keenly sought after by many employers. Norcross (2014) describes two dimensions of benefits gained by undergraduate learners undertaking research. First, they learn about generating research ideas, literature searches, collecting and analysing data, and textual and statistical reporting. Second, they get to develop and enhance interpersonal skills such as teamwork, consulting, and liaising with academic and community partners.

The lead author had already commenced an approved research project within the Waikareao estuary, incorporating not only shellfish populations, but also vegetation species and water quality monitoring. The Student Summer Scholarship opportunity allowed the project to contract a second-year student from the Bachelor of Environmental Management to assist with data collection and analysis for a subsection of this project: the three shellfish populations. The purpose of the study was to quantify kaimoana by measuring pipi, tuangi and tītiko populations in tidal zones across six sites in order to provide a clear snapshot of the estuary's health and condition. Overall, the experience of carrying out the study provided an example of how research is useful to communities by focusing on the positives of collaboration. This article aims to describe the experience and highlight these positives.

AIMS AND PURPOSE: WHAT WAS THE PREMISE FOR LEARNING?

The learning premise was based on the tuakana–teina concept, a traditional Māori cultural philosophy and practice which literally refers to a family relationship, like siblings, with an older and younger member supporting one another (Smith, 2017). In this model, the outcome should benefit all involved and form a base on which to build future relationships for collaboration and learning. We adopted this model to mark a difference from the teacher–student dynamic which characterises the term-time relationship between the two co-authors of this article. In our discussions prior to the project's commencement, we identified a three-way sharing of knowledge. Our expectations were that there would be learning by the student and the hapū from the researcher; learning by the researcher from the hapū and the student; and learning by the hapū from the student and the researcher.

BACKGROUND

Building student research capability and experience

Reavis and Thomas (2019) note the value of research experience as part of a tertiary qualification, and argue for a scaffolded approach as the most effective way to promote intensive and confident engagement in research. In their model, students learn the theory of research methods in the classroom, then undertake research-focused studies including guided critique, and finally complete a "cumulative senior research project" (p. 1), working closely with faculty. For these American lecturers, "institutional support for focused student research (such as paid opportunities during the summer …) is critical" (Reavis & Thomas, 2019, p. 3). This model, in fact, is a fairly close description of the teaching and learning experience related to research, and the student–faculty collaboration, described in this article.

Each year Toi Ohomai Institute of Technology awards up to ten student scholarships, each worth $6,000. These scholarships are for ten weeks' duration, in which time the student undertakes a research project of relevance to the region, under the theme selected for the year; in 2021, this was Connections. The scholarship requires a staff member to be available to actively supervise the work, which can be part of a larger staff project, but the application must specify and focus on the aims and outcomes of the student research component.

In the latter part of 2021, the lead author was successful in an application to fund an extension to a current, internally approved research project evaluating kaimoana health by measuring pipi, tuangi and tītiko shellfish populations in the local Waikareao estuary's tidal zones. The student researcher would assist with the scientific collection of data, liaise with members of the sponsoring hapū, Ngai Tamarawaho, and provide content for a data dashboard. This tool is in development and will be accessible via a web browser, presenting data in an easier-to-understand format than a traditional report, and hence making them more accessible to a more diverse audience.

The setting: Waikareao estuary

Estuaries are a highly important habitat for shellfish and other marine species, as they provide shelter and a source of food. Not only are estuaries important for surrounding biodiversity, but they are a highly valued part of a catchment for societies, especially for Māori as they traditionally provide a wide range and abundance of mahinga kai (natural food resource/sea garden) including shellfish, fish and even birds (Kainamu-Murchie, 2017).

Studies which attempt to define estuarine environments often look at large-scale influences such as latitude, climate and tidal influence (Hume et al., 2007). Assessment of estuarine sandflats often reveals changes in species' community composition; this is generally termed patchiness (Kotliar & Wiens, 1990). This patchiness not only affects human consumers who rely on these sources as part of their food supply, but also influences food webs, or food chains, whereby other species such as fish rely on shellfish, for instance, as the main part of their diet (Gaston et al., 1998). While research into patchiness has been undertaken internationally, such studies are not numerous and New Zealand studies are rare (Morrisey et al., 1992).

The Waikareao estuary is a shallow, tidally dominated estuary close to Tauranga city centre, surrounded by many walking/cycling tracks and boardwalks. The estuary is approximately 2.5 square kilometres and has a perimeter of approximately 8.3 kilometres. It is a shallow estuary, having an average depth of approximately one metre above lowest astronomical tide (Figure 1).

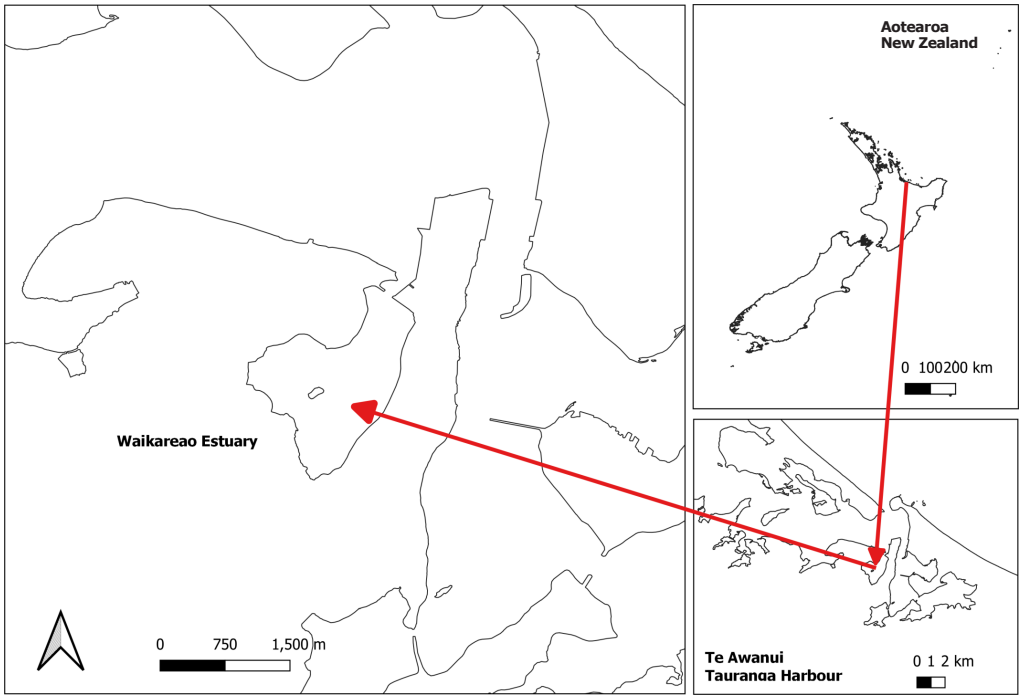

Figure 1. Waikareao estuary, with reference to the wider Tauranga harbour and Aotearoa New Zealand. Contains data sourced from the LINZ Data Service licensed for reuse under CC BY 4.0.

The main environmental impacts are urban stormwater running into streams around the estuary perimeter and runoff from a nearby industrial estate. The western side is considered to be a site of significant ecological interest and is protected as the Waikareao Wildlife Refuge (Cromarty & Scott, 1995). Several recent regional council reports on sediments and contaminants have found higher levels of various contaminants than in unimpacted estuaries, but none exceeded safe levels for human consumption at the time the reports were made (Park, 2003, 2009). The present study aimed to reference and build upon previous studies and provide valuable, updated information on kaimoana health in the estuary.

Kaimoana and its importance to local iwi

Three shellfish species, tītiko (*Amphibola crenata*), tuangi (*Austrovenus stutchburyi*) and pipi (*Paphies australis*), were selected for the study because of their importance to the local communities, and because they had already been identified as an indicator of the cultural health indexes for the region (Taiapa et al., 2013). An added advantage was existing baseline data from wider studies of Tauranga harbour (Clark et al., n.d.; Ellis et al., 2013; Sinner et al., 2011).

Ngai Tamarawaho hapū of Takitimu and Ngati Ranginui origin have manawhenua (authority over territory) over the Waikareao estuary and also along the port of Tauranga. The Waikareao estuary has a high cultural significance for the people of Ngai Tamarawaho as it is considered a pātaka/ketekai (food cupboard/basket) where shellfish was, and still is, traditionally harvested. The iwi's own report (Ngai Tamarawaho Management Plan, 2021) notes that, sadly, the estuary has been subjected to unauthorised and untreated discharges from many sources, contributing to poor water quality and an inferior marine environment. This has also left a serious

and negative impact on the mauri (spirit) of Waikareao. The hapū are now actively promoting their role as kaitiaki (caretakers), seeking to restore their traditional waterways in partnership with local authorities and other stakeholders, and reinstate the abundance of kaimoana:

> All the waterways and water sources within our rohe – large or small – are important to us.
>
> The sea and the waterways have nurtured our people – they have formed our pathways, have been places of sustenance for us for … the estuary and the harbour and sea – our food bowl and garden. (Ngai Tamarawaho Management Plan, 2021, p. 10)

A series of meetings with representatives from Ngai Tamarawaho informed the scope of the survey and the presentation of results, and further discussion will be disseminated in an upcoming hui. Several other research projects have already commenced as a result of the initial success of this study.

METHODOLOGY

While shellfish are not considered a species for ethics approval, the study was designed to have minimal impact. The estuary is already under pressure from surrounding urbanisation and environmental impacts. With this in mind, all species were counted and measured in situ and returned to where they were found. After a few tidal cycles there was very little evidence left of our surveys.

Six sites around the shoreline of Waikareao Estuary were selected; three sites were alongside mānawa (mangrove) and three sites alongside urban rock pathways (Figure 2).

Figure 2. Survey sites 1–6. Contains data sourced from the LINZ Data Service licensed for reuse under CC BY 4.0.

Each site was accessed during a four-hour period, from two hours before low tide until two hours after low tide.

Two transects were conducted at each site. Records were kept for each sampling, including the time and environmental conditions such as weather conditions, low tide time and level. Each 50m transect was placed perpendicular to the shoreline to measure the length of each zone, as identified by the researcher – for example, zone 1= reeds/mangroves, zone 2= mudflat/sandflats. Next, 5 x 25m^2 quadrats were set haphazardly within each zone at each site, and the top 1cm of sediment was scraped back by hand. All live tītiko, tuangi and pipi were counted, photographed, identified and measured at their longest length. Worm and crab holes were also counted. On completion, all organisms were returned to where they were found.

Throughout the site monitoring period, the student researcher liaised with members of Ngai Tamarawaho, who joined her out on the estuary and showed an interest in the data collection and findings. As Māori herself, the student respected how deeply the local responsibility of kaitiakitanga is felt, understanding the principle that the landscape and its resources are the main inheritance we will leave future generations (Harmsworth, 2005). Therefore, viewing iwi stakeholders as partners in the research, and respecting the taonga (treasure) of the local estuary life, were important aspects of the project's methodology.

The learning and teaching methods focused on the collaboration between the student, hapū and researcher. As we learnt and applied the methods for scientific surveying together, we discussed history, cultural significance and personal perspectives and values. Alongside these research skillsets and understanding of our own positioning as researchers, there was time and opportunity to incorporate interpersonal skills (Reavis & Thomas, 2019) as the project brought us into contact with stakeholders external to the research team and our home institute. Assisting with the surveys was open to anyone interested in helping and wanting to learn, providing both partners with the opportunity to teach and learn from a diverse crew of helpers – members of the public, local community groups and iwi.

FINDINGS AND DISCUSSION

Shellfish health

Across the six survey sites completed, tuangi were the most common bivalve species found within the estuary, with over 1,000 individuals recorded. The average length varied within each site, with one location having the largest mean length of 11.32mm, but the overall average was 8.09mm. Pipi were only found at one site, with an average size of 8.79mm. Tītiko numbers were scarce, with only a single population found, at an average length of 10.86mm.

Unsurprisingly, sites closer to the highway had lower numbers, whereas when the transect line was extended further into the estuary, higher abundances were found. However, one site with a healthy population (100) of tuangi actually had the highest visible pollution rate. At this site, discarded plastic, glass bottles, dumped household items and vehicle hubcaps were found. Vegetation zones and other species also varied. Zonation also affected which species were most abundant. For example, horn snails or koeti (*Zeacumantus*) were found in the greatest abundance within the muddy-sand zones of sampled sites and also on various species of drifting algae. Many anemones, barnacles and limpets were observed clinging to many of the tuangi and pipi found near the sand-flat and muddy-sand zonation areas. Purple whelks were also highly abundant in firmer sand areas. Rock oysters (*Saccostrea commercialis* and *Crassostrea gigas*) and black rock snails (*Nerita melanotragus*) were predominantly found near site one, attached to boulders that retain the footpath around the western side of the estuary.

While no ground-breaking results have been realised in the study, it was worthwhile as preliminary research contributing to the project supervisor's larger study, and will feed into an overall evaluation of kaimoana and estuary health when final results are set against measurements from previous studies.

Learning for supervisor and student

First, the exercise of determining quadrat sites using patchiness as a visual clue appeared to work well, showing that that the observer's eye was reasonably reliable in differentiating between habitats. Applying scientific method in the field, having studied the principles in the classroom, is important for students to gain research experience and confidence. All aspects of the research – from planning and scheduling estuary visits around weather and tides to the importance of accurate recording – are useful foundations for the final, independent year three research project and subsequent postgraduate studies.

A second learning related to the relationship which developed between the researchers and the local iwi, Ngai Tamarawaho. The student is local Māori, although from a different marae, but was knowledgeable, mindful and respectful of local tikanga. The study was work that this key stakeholder group wanted undertaken, and they are keenly interested in the final results. Later this year when the entire project is finished, the plan is for a report to be produced for dissemination to Ngai Tamarawaho hapū and the wider community, other stakeholders and supporters including our local councils. In addition, the information retrieved provides a valuable store of knowledge for both the programme and mana whenua with which to review any change over time affecting these taonga, allowing suggestions for interventions.

On a small scale, this research supports what Winiata (2009, p. 4) regards as the three common environmental goals of iwi and hapū:

1. The revival and protection of taonga such as fauna, flora and their marine, freshwater and terrestrial ecosystems
2. The wise, sustainable use of resources in order to sustain their mauri and that of the people
3. To achieve tino rangatiratanga rights and kaitiakitanga responsibilities relating to iwi and hapū resources.

Learning also occurred through the positive tuakana–teina relationship between student and supervisor (Smith, 2017). The tuakana supervisor who held the scientific and academic expertise is an immigrant to Aotearoa New Zealand; the teina summer scholarship student had local and cultural knowledge that they were able to contribute.

Back in the classroom, the learning has extended to the student's peers, as she has been able to speak with authority and confidence about the planning and implementation of applied research in the field that directly benefits the community who hosted it. It has helped her classmates on the 2022 marine and environmental course to expand their understandings of te ao Māori, and has led to further student research projects, currently underway in the estuary.

Outcomes

The student has gained experience and is now in her final year of her Bachelor's qualification. She has a documented project to include in her learning portfolio and continues to be a part of the study, contributing to the drafting of this article with her final report and preparing for a planned co-presentation at a national conference with her supervisor, later this year.

Other students are also benefitting; the project's early indications of success have supported the inclusion of a further five students in later phases of this research, which will be conducted later in 2022. Some of these roles will be fieldwork, but likely others will focus on completing an online 'dashboard' to show data as a graphic representation, rather than text, for public use and easy access. We have also 'bookmarked' our observations of pollution and waste present in the estuary as a possible clean-up project for a staff workday, or the rationale for further research related to restoration and sustainability of natural ecosystems.

Interactions with local iwi, councils and communities have enhanced connections and mana for the institute and the Environmental Management programme.

CONCLUSION

We hope that by sharing this account of a summer fieldwork project, we have been able to demonstrate the value of growing future environmental and marine advocates. Students need practical applications of the concepts they learn about in class and view during field trips. Working within a research project adds authenticity to learning about scientific processes, while developing a range of professional skills such as problem-solving, record-keeping, reliability, responsibility and following one's own initiative. Partnerships between supervisor and student in 'owning' the research and sharing findings, such as this article, help the student find their voice in the academic community. Allowing the student to take the lead in day-to-day communications with local iwi members enhances their mana. Above all, bringing these experiences back to the classroom keeps the programme current and relevant.

It is important that work in local environments connects closely with Māori whose whakapapa (ancestral lineage) has a strong relationship with a defined geographic area. Their expertise, knowledge and perspectives based on traditional culture, beliefs and values must be respected and upheld (Harmsworth, 2005). Resource management is becoming more complex, with multi-layered expectations and requirements for environmental, social, cultural and economic goals and outcomes. The key to achieving balance lies in working productively together (Harmsworth, 2005; Tipene-Matua et al., 2009), and participation which introduces diverse perspectives on an issue and the integration of different types of knowledge lies at the heart of this.

Collaboration with local governance bodies is also critical – for long-term management, but also for immediate control and funding to prevent further degradation of our estuaries. An important action we will be calling for in our final report is that the dumping of rubbish by the public from the highway must be regulated. The breakdown of non-degradable items is not only unsightly and disrespectful, but can also cause leaching, thus creating an unsustainable environment for all biodiversity in and around Waikareao (Scott et al., 2005). Two of the target species monitored in this project are found in only one of six sites where they were previously observed, which means that some of our shellfish populations are already dwindling.

Part of the role of teaching and learning is preparing our students for the world of work. Future employers of our science graduates include local bodies, community groups and industry – all of which are increasingly focused on practices which support Māori–Crown relationships and the principles of te Tiriti. Sustainability and protection of the environment are also critical factors in modern organisational culture. Projects like this one demonstrate the importance of collecting and sharing evidence of local habitat health, and of creating connections through shared concerns and causes. We hope others undertaking student research will be encouraged to find opportunities to likewise connect with communities and councils, and awaken the voice of our next generation of scientists.

David Culliford came to Aotearoa via the Pacific on a sailboat in 1999 and has spent the last 20 years working around Tauranga. About 15 of those years have been involved with research in the Tauranga Moana and wider marine environment. He is strongly interested in the land/water interface and conservation through community.

Amohia Peka was born and raised in Rotorua. Her environmental science journey began in 2020 when she developed a deep passion for marine and freshwater ecology. She finds great interest in working with iwi to help maintain and restore the mauri of culturally significant areas.

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NEURODIVERSITY & NEURODIVERGENCE

Article

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DIFFERENT NOT LESS: NEURODIVERSITY AS A LENS FOR UNDERSTANDING OUR STUDENTS BETTER

Stella Lange

Those Students

They are so rude, those students,
the ones who ask questions,
questions that you did not think were important.
Questions like
how many pages? or what format?
or what kind of approach the work might take?
Questions that they should be able to answer,
that are 'common sense' and
'not important now.'
They are so rude, those students,
the ones who want to know the details,
they are so rude,
those students.

They are so rude, those students,
the ones who will not meet your eyes,
who do not care for small talk,
who interrupt
and don't wait for you to finish.
They take notes,
they consider the class content,
they weigh up the value and sense of what you teach
and they ask you direct questions.
They work quietly
and let you know when they need help
yet
they are so rude – when they will not meet your eyes,
or chat,
and they interrupt.
They are so rude,
those students.

They are so rude,
those students.
The ones who will not socialise,
who sit away from the group,
far from the rest.

The ones who do not join us at the coffee shop, the pub,
and the end of day or weekend events we have planned.
Oh – they turn up and help,
and they 'pull their weight'
but
you know, they do not join in outside of class,
in the social stuff.

They are so rude,
those students.

March 2022

INTRODUCTION

This poem, "Those Students," this collection of 241 words, sets out to express a chasm that is little talked about in education. In my 25+ years of teaching, and my 50+ years of being a student, I have heard others talk about "those students" and I suspect I have been that student.

As I progressed through the education system, from primary school, to secondary, to tertiary, to postgraduate study, and as I crossed the invisible boundary from student to teacher, I continued to hear about "those students." I became party to conversations in informal education spaces of community education, at sessions for parents at primary schools and in higher education, at university, at polytechnic and in professional development spaces; over the years multiple conversations between educators about "rude" students. In some of those conversations some students were discussed and considered a problem: they were rude. And yet, I had never experienced those students. I had some students who were quiet and those who were not; some who asked detailed questions and some who did not; some who were friendly and talked about their world beyond school and others who were more private – but none that I considered rude.

These conversations, these responses, these observations, stayed with me, they bothered me – for my students were not rude. To me, these same students were keen to learn, asking questions, engaged and seeking answers to aspects that confused them. I began to connect the dots and recognise that these students were not rude – they were perhaps, instead, neurodiverse. Perhaps I did not recognise those students, for they were the same as me?

Conceptualising these 'problematic' student interactions as communication errors between neurotypical and neurodivergent individuals allows for a more nuanced understanding than simply labelling them as rude. In this article, I introduce neurodiversity, describe how understanding of neurological difference has developed, and introduce commonly identified expressions of neurodiversity. These are positioned within a social model of disability. I discuss how some of the familiar expressions of neurodivergence can be misread as people being difficult, rude or lazy. I conclude with a plea, from my neurodivergent self, for educators to reconsider how they view their students.

WHAT IS NEURODIVERSITY OR NEURODIVERGENCE?

Judy Singer developed the term neurodiversity in phone conversation with Harvey Blume (Silberman, 2016, p. 492). Both Singer and Blume published using the term "neurodiversity" in 1998 (Lollini et al., 2018, p. 74; Singer, 2017). Singer's goal was to reflect social changes in the disability rights movements of the 1990s. She observed the autistic, Asperger's and gay rights communities pushing back against the three narrow and limiting medically defined types of disability which had been developed in the nineteenth century: physical, intellectual

and psychiatric. Singer (2017) developed the term neurodiversity to describe humans as presenting across a spectrum of neuro-abilities, or neurological pluralism. Using the category of neurominorities – and by default neuromajorities – Singer suggested that it was natural to expect the way minds work to be diverse and full of variation across the human population – and, beyond that, for it to be important to recognise and value neurological diversity

Neurodivergence, the individual expression of neurodiversity, is perhaps new to many educators and yet it provides a valuable way to make sense of others, including students who are not like us. Singer's neuromajorities are now commonly referred to as neurotypical (NT), and her neurominorities as neurodivergent (ND). In Aotearoa New Zealand, kanorau ā-roro is the te reo Māori term for neurodiversity, as takiwātanga is for autism, and raru kori tinana for problems with coordination (Opai & Severne, 2020). Neurodifferences are normal and known across many cultures (Clouder, 2020). Importantly, neurodiversity offers a focus on strengths and differences, presuming competence rather than a fixation on disabilities (Donaldson et al., 2017; Institute of Leadership and Management, 2020).

Some aspects of neurodiversity are more readily understood. Dyslexia and dysgraphia (trouble with handwriting) are widely recognised and most educators are able to connect such learners to resources and supports to help their learning. This was not always the case. As recently as 2007, the term dyslexia was avoided by Aotearoa New Zealand's Ministry of Education who did not wish to "develop an education system which defines and categorises students in terms of their disabilities" (cited in Marshall, 2008, p. 9). While dyslexia might now be more readily recognised, accepted and supported, this is not true for other hidden neurodivergent differences which are not yet part of tertiary education approaches in Aotearoa New Zealand. This needs to change.

Neurodiverse expressions include dyslexia, dyspraxia, dysgraphia, dyscalculia, attention deficit hyperactivity disorder (ADHD), autism spectrum conditions and Tourette's syndrome (Mirfin-Veitch et al., 2020; Institute of Leadership and Management, 2020). There is sometimes debate on how to differentiate between differences that are natural and those that are the result of trauma or specific injury (for example, concussion), or other brain variations like epilepsy or tumours. While medically it may help to know about the origin of difference, educationally that is less critical than understanding what that difference means for our learners.

Many schools have systems and supports in place to aid students who need assistance, for whatever reason. Educators universally accept in the case of dyslexia and ADHD that students' brains, their neurology, works differently, and are almost always willing to work to find solutions that promote learning and achievement.

Sadly, researchers report again and again that neurotypical adults have implicit and explicit biases against neurodivergent individuals (for example, Dickter et al., 2020; Institute of Leadership and Management, 2020). Importantly, neurodivergent individuals have no problem communicating with other neurodivergents; communication and acceptance are only a problem across the neurodivergent/neurotypical divide (Chapple et al., 2021). There is clear evidence that many neurotypical individuals read neurodiverse communication styles as rude (Cagaanan, 2017; Institute of Leadership and Management, 2020). As educators, we need to consider our own biases and ask if we are unfairly expecting neurodivergent students to be like us, or if we can be open to accepting each individual as unique.

SOCIAL MODEL OF DISABILITY

Conceiving disability as a social and environmental construct is key to accepting as valid and normal the very different experiences of many humans. Assuming everyone is the same, physically and neurologically, positions humans as having universal abilities in terms of mobility, sensation and communication. Mike Oliver (2013) writes of introducing a "social model of disability" 40 years ago. In that model, it is the structures and expectations prevalent in a society that lead to real problems for individuals. To be blunt, disability is something society

creates. The classic example is that stairs impede wheelchair users and those with poor mobility – so if we build buildings with ramps, lifts or that are single-level we can eliminate many mobility challenges. A social model of disability opens a way to see individual experience and ability as unique, not universal. When we assume that everyone is like us, we place others at a disadvantage.

ASKING QUESTIONS

Neurodiverse individuals experience life differently to neurotypical individuals. Autismo: Mi cerebro atipico (2020) explains that for many neurodiverse people, the details of things and how information fits together are important for understanding. This focus (known as hyper-focus in the neurodiverse community) means that we can get stalled if some of the information we need to understand the problem is missing. Asking questions about a task or assignment, or even a topic, can be seen as a challenge to authority, or being difficult, yet it is essential so we can understand what is being asked and complete the work. Neurodiverse minds often find it difficult to process lots of information at once, so breaking instructions down into mini-steps and complex two- or three-part open questions provides clarity for all students.

Task inertia is a very real problem for someone with ADHD and autism. Part of executive function, task inertia describes not being able to start a project or task, especially one that requires pulling together a lot of information (Low, 2022). Educators unfamiliar with the approach of a neurodivergent student may see this as avoidance or procrastination. Inertia is discussed by Tanea Paterson (2016), using te reo Māori, explaining that "Te Kore, [is] a time of gestation, a chaotic void waiting to produce life." For many neurodivergent people, there is always a pause prior to beginning any project, which is a vital part of their learning and process. Assuming that all students can "work out the details as they go" and that they "just need to focus and get started" fails to acknowledge that many assignment tasks were written for a neurotypical mind, and falls short of providing neurodivergent students with strategies to do well.

Many neurodivergent brains can hyper-focus, with the stamina and drive to deeply and thoroughly research a topic (Autismo: Mi cerebro atipico, 2020). Students who work very independently are often criticised for not engaging with class resources. Their deep dive into research is not intended to undermine the authority of educators, but demonstrates a desire for deep authentic learning and to fill in all the pieces of the puzzle of knowledge, not just what can be covered in class.

EYE CONTACT, SMALL TALK AND INTERRUPTING

For many neurodivergent people, communicating requires intense focus, and is best done by avoiding visual distractions. We focus by looking away or closing our eyes when talking or listening, yet this is seen as rude or disruptive in tertiary classrooms (Thomas, 2020). Looking elsewhere is not always a mark of avoidance, but may instead demonstrate a more active engagement with what you are saying and a more considered response than merely meeting your eyes. I still cringe when I remember coaching a student, decades ago, to make eye contact. I worried and warned them that a failure to do so would affect how they were judged – and they were preparing for an event where they would be judged on an international stage. Now aware of the cost to some neurodivergent people of making and maintaining eye contact, I want to apologise: at that time I didn't recognise my expectation to meet neurotypical behaviour norms. I did not allow them to be authentically neurodivergent.

When talking, neurotypical people unconsciously mark small changes in others' breathing and inflection so they can effortlessly take turns in a conversation – this is not always true for neurodivergent people (Denworth, 2018). Identifying such interruptions as rude, without considering they may be the result of timing miscalculations, means that neurodiverse students are often considered rude. Considering students may have interrupted us, or others, through poor timing frames such interruptions as an excited contributions rather than rude interruptions.

SOCIALISING

Difficulties in social interaction make face-to-face exchanges less fun and more work. It is no wonder that neurodivergent students often step away from social activities, be those scheduled or optional. Sara Ryan and Ulla Raisanen (2008) discuss how many neurodivergent people feel like a spectator in a neurotypical world. They describe neurodivergent individuals knowing what people are '"supposed to do' but not being able to do that" themselves (Ryan & Raisanen, 2008, p. 138). As a neurodivergent individual, I constantly monitor my self-presentation to others, the result of numerous negative comments across my lifetime. So many incorrect observations that I was tired, sad or angry, when I was none of those at the time, have made me cognitively aware of a need to present a pleasant face to the world, lest I be judged and found less than I should be. This constant monitoring is tiring and exhausts me. If all the world is a stage, neurodivergent individuals are perhaps more aware of their critical audience than many others.

Many neurodivergent people find living and operating in a neurotypical world exhausting (Autismo: Mi cerebro atipico, 2020). The cognitive load involved in filtering out background chatter, of making sense of words and possible implied meanings, deciphering facial expressions or 'tone' and cognitively adapting responses to fit in drains energy. Many neurodivergent people report needing time to withdraw and recover (Evans, 2019), and yet this can be interpreted as anti-social. Recognising that socialising requires additional cognitive energy is important to reframe an absence at a 'optional' event as self-care and not as rude.

SPOON THEORY

Spoon Theory is a useful way to conceptualise the work required to be present. Introduced by Christine Miserandino (2003), spoon theory illustrates the very real price of living with an invisible illness or disability. The theory provides a fixed number of spoons per day, and then tags activities during the day as either using up spoons or providing extra spoons. A noisy environment may use up three spoons, while a less demanding activity like meditation may replenish one's spoons for the day.

Many neurodivergent individuals have some level of sensory processing disorder (SPD) (Fox, 2020), so experiencing significant and draining external stimulus from bright lights, unfiltered background noise, visual background clutter, smells of cleaning chemicals, food or perfume worn by others – and even the feeling of clothing, especially the seams or labels – depletes one's reservoir of "spoons," leaving none for learning or participating in class. The added cognitive work of filtering out the bustle of public transport while travelling to class, or monitoring the day's social interactions, and even their own facial expressions, means many neurodivergent people begin the day with fewer "spoons" than other students. During the day one's spoons are depleted, and it is likely that neurodivergent students have fewer reserves to manage tricky situations later in the day. After-class socialising or evening celebrations are exciting for neurotypicals, but are likely to be simply too late in the day to be possible for those who have used up all their spoons. Simply getting to class some days may leave neurodivergent students with not enough spoons to do well.

SUMMARY

When we seek clarification please do not label us as confrontational. For neurodivergent students, checking what a teacher really means does not feel like we are being rude – we are interested and concerned enough to check that our understanding is sound. If we can't make eye contact, or we have no energy to socially interact and make interested faces, please do not judge us. If we consistently mis-time our speaking and interrupt you, we feel like we have failed. If we have done extensive research and are wanting to discuss a topic in depth beyond what is covered in this class, know we are not challenging you. Please know that all this is a compliment that your classroom is a safe enough environment for us to be authentic.

And when some people describe us as rude, that sets us apart, makes us different and sets up an imagined barrier.

We are not rude, we are neurodivergent.

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LIVING WITH A CHAOTIC MIND

Amber Fraser-Smith

INTRODUCTION

Picture yourself as the chief executive officer of a successful educational institute. Your head office has a team of workers who efficiently organise courses, plan and structure programmes and make sure operations run smoothly throughout the organisation. They know what needs to be done, when it needs to be finished and how this can be achieved in a logical and structured way. They complete their tasks, reflect on their work and apply changes where necessary. As a result, the whole organisation consistently functions well and success in all ventures seems likely.

Unfortunately, the chief executive in charge of the head office in a neighbouring body is having a somewhat different experience. In this office, the executive team appears to be rebelling. While most of them are brimming with enthusiasm and new ideas, the majority struggle to get started. Those who manage to start cannot prioritise the tasks and end up focusing on the least important parts, resulting in crucial deadlines being missed and stress levels rising. Meanwhile, another group with great potential has taken to long coffee breaks and hours spent gazing out the window. Dysfunction such as this can lead to an executive team that is destined to fail.

[Comments from a chaotic mind]: It has taken me an entire day to write this introduction. During that time, I have reworded it numerous times, lost my changes twice and gazed at the beautiful bay out my window for an indeterminable amount of time. Yet again. Years ago, in a desperate attempt to understand my chaotic mind, I enrolled in Psychology 111 and began a journey through the human brain.

The executive office occupies prime real estate in the brain. Situated in the prefrontal cortex – the part of the brain that sits behind your forehead – is the executive functioning 'suite': a set of cognitive processes and mental skills that includes attention, working memory, inhibition, motivation, planning and problem solving. Each of these areas needs to be functioning well to cope with everyday tasks such as goal setting, prioritising, remembering information, controlling emotions, assessing progress, adapting plans when necessary and completing tasks. When the executive functioning area is not working as efficiently or consistently as it should, completing tasks becomes considerably more difficult and the likelihood of a successful outcome falls.

The chaos that ensues in the executive functioning area of the brain has its own label: *executive dysfunction*. Most often associated with ADHD, this condition can also affect those who are autistic, those with traumatic brain injuries (McDonald et al., 2002) or those who binge-drink as an adolescent, largely due to the harm caused by alcohol on a developing prefrontal lobe (Parada et al., 2012). Executive dysfunction can negatively affect academic outcomes (Baars et al., 2015). Yet, many students are not aware that their learning issues could have a neurological basis and so attribute their difficulties to character weaknesses instead, which can damage self-esteem and increase stress levels (Cicerchia, n.d.).

I wish someone had helped me identify my executive dysfunction earlier in life and introduced me to strategies that would help the learning process. By seeking help from support services, reading extensively on how to learn and using the

superpower of sheer determination, I had success in my studies, but not without an ongoing struggle that led to increased stress levels. Did it have to be like that?

ASSESSING EXECUTIVE FUNCTIONING

When specific executive functioning issues are identified, support can be given in the form of information, opportunities for discussion and targeted interventions. Using a combination of these, students can learn more about their own executive functioning, identify and understand their personal strengths and weaknesses, and then find and share ways to help improve their learning skills. An assessment to identify specific executive areas can be done using self-report scales such as the BRIEF-A, the Behavior Rating Inventory of Executive Function – Adult version (Roth et al., 2005). Using a similar self-report scale, Baars et al. (2015) noted that students' own perceptions of their executive functioning helped them identify specific weaknesses early in their studies, thereby enabling suitable interventions to be used to assist learning. Meltzer and Krishnan (2007) supported the need for the early identification of executive dysfunction, claiming that the issues associated with it tended to become more apparent as students progressed through the education system and academic requirements became "more complex and conceptually demanding" (p. 80).

EXECUTIVE FUNCTIONING IN THE CLASSROOM

Executive functioning plays a huge role in tertiary education as it provides students with the skills they need to decide on, start, plan, assess and complete tasks. Just like members of the executive team who are not doing a job properly, the executive functioning area that is not functioning correctly may need some advice and training. Incorporating lessons on *how* to learn within the usual content-based lessons can help provide this training. By identifying executive functioning tasks that need work, teachers and students can look for ways to specifically target those areas. Finding appropriate strategies that help compensate for deficits in executive functioning can increase the likelihood of academic success (Baars et al., 2015). While many students who have reached higher education already know how to plan, prioritise and organise, a significant number will not have fully developed these essential skills. Given the increased amount of independent learning needed at a tertiary level, it is almost inevitable that these students will need some help to make this transition successfully. While some will actively seek help from student support services and gain access to advice and resources, many will not, leaving them to struggle, miss deadlines and experience stress, self-esteem issues and, for some, failure.

Stress has been a loyal companion on my learning journey. I have an innate curiosity about the world and a strong desire to learn, but find it exceptionally difficult to start tasks. By the time I start, the deadline is looming, and last-minute pressure heightens my anxiety, resulting in brain fog, a further loss of self-esteem and – in the past – a self-given label of 'hopeless.'

OVERCOMING NEGATIVE SELF-BELIEFS

Low self-esteem is common in those who experience executive dysfunction on a regular basis. Most students with learning issues, such as executive dysfunction, arrive in the tertiary classroom having already experienced difficulties in the academic environment and, as a result, may begin their new learning experience lacking in both confidence and self-esteem. To help counter these negative self-beliefs, students need the opportunity to identify the strengths that they bring with them on their learning journey. This could be achieved through looking at their past successes, discussing how they have dealt with problems previously or analysing character strengths they possess that support resilience. They may also benefit from considering the cultural and societal factors that make some traits valued and suitable in one environment, but seen in a negative light in another. In one example given in the book *The Power of Neurodiversity: Unleashing the Advantages of your Differently Wired Brain*, Thomas Armstrong (2011) draws attention to the similarities between distractibility, which those with pre-frontal issues

often have, and creativity. He points out that in the classroom, distractibility comes with a negative label, while "with the creative person this [distractibility] is called having a divergent mind and is seen as one of the hallmarks of a great mind" (p. 40).

After identifying weaknesses and strengths, students and teachers can work together to find strategies to deal with the elements of executive functioning that are causing problems. To start this process, Gaskins and Pressley (2007) recommend an instructional approach that includes "explaining strategies, discussing how the brain works, modelling self-talk, orchestrating self-assessment, and encouraging students to monitor and control person, situation, task, and text variables" (p. 280), adding that this process needs to be accompanied by explanations of each stage and scaffolded practice opportunities. Guidance and support such as this is helpful in what Moran and Gardner (2007) term the apprentice stage, where the student learns the skills needed to function well in society. Nevertheless, the ultimate aim is to empower students to become more autonomous in their learning by finding and using the strategies that work well for them.

To this end, the Māori concept of ako is the ideal way to share ideas and learn from others. Ako represents a reciprocal relationship where it is recognised that both students and teachers bring knowledge and experience to a learning environment, and this can be combined to bring about new knowledge and ways of understanding. In collaborative sessions, students and teachers can discuss their own learning strategies, the effectiveness of each strategy and ways to adapt them as necessary. The use of ako helps empower students by giving them the opportunity to share their own knowledge and experience, find solutions to their own problems and help other students on their learning journeys.

I could have used some strategies to help with the organisation of materials while studying for my Master's degree. I wrote copious notes in various notebooks and on random pieces of paper that I left throughout the house. Two years down the track, I am still discovering notes that would have been useful in my thesis.

STRATEGIES FOR LEARNING SUCCESS

The following strategies come from a range of sources – educational, psychological and neuroscientific research, personal experience and anecdotal evidence. They are shared here as a starting point, with the hope they will be tried by students and teachers, discussed and adapted to suit.

Organising the chaotic mind

For the chaotic mind, starting each semester with strategies for organising materials can be hugely beneficial. Learning ways to find, file and assimilate new information early in a course can help students keep on top of their materials, easing pressure further down the track. Developing an efficient and consistent filing system, whether this is electronic or paper-based, is particularly helpful early in the semester before paperwork gets out of control. For some, clear folders to hold loose papers can save a considerable amount of time searching for information, as can adding colour coding to files or having one exercise book per subject. Time management skills are equally important at this stage so that, using wall calendars, diaries and schedulers, students can practise dividing their week and days to better schedule classes, independent study, work and family commitments. This skill can be further developed by encouraging students to assign times to tasks and then later check how accurate their estimates were, adapting these as necessary.

Initiation and procrastination

Starting assignments can be a major hurdle for some students. Procrastination is prevalent in the academic world and while it can be easy to label procrastinators as lazy, Rabin et al. (2011) found a strong correlation between

academic procrastination and executive functioning issues. They pointed out that people with issues in this part of the brain usually have the desire to do the task, but lack the ability to get started. Ongoing procrastination can lead to a host of negative consequences including stress, low self-esteem and a reduced likelihood of academic success.

Incorporating planning time into the curriculum can help students learn ways to overcome procrastination problems. An example of this might be a weekly 15-minute session where assessments and study tasks are discussed in class, in groups or one-to-one. The time could be used to help students gain an understanding of the tasks they need to complete, including how to break goals into sub-goals, how to meet requirements by using the provided rubrics and how to prioritise tasks. By practising these skills with their own assessments, students can gain a better understanding of the processes involved in completing a task, improve their time management and organisational skills, and increase their confidence to work more autonomously in the future.

Students who normally delay starting a task may find the Pomodoro Technique useful. This method involves choosing a task, setting a timer for 25 minutes, working consistently on the task during that time and then having a break for about five minutes. The idea came from Francesco Cirillo, an Italian university student who was struggling with his own low levels of productivity and lack of focus. Using a timer the shape of a tomato (pomodoro in Italian), he challenged himself to work for a set amount of time. After practice and adaptation, he developed the Pomodoro Technique to help increase motivation, improve focus and reduce anxiety (Cirillo, 2006).

A few days before this article is due, I ask for an extension. Given the topic of the article, I feel like crawling under the desk. I breathe a sigh of relief when met with a sympathetic response, but still feel embarrassed. I had delayed beginning the article and when some unexpected events occurred in my life, I was unprepared and fell behind in my writing. Even with a generous extension, I can feel the pressure increase. Sometimes life throws curveballs, and I need strategies to help me deal with them more effectively.

Learning to self-monitor

It is a simple fact that plans change. Self-monitoring is the ability to assess a plan, determine how well it is going and adapt it as necessary. It is a particularly valuable skill for those who wish to avoid making the same mistakes repeatedly, wasting time or going off on a tangent. Having some advice on how to self-monitor can help those who get distracted to stay on track, rather than heading off in the wrong direction. It can also help those who persevere with plans that are not working. Progress checks could be incorporated into class time, with students meeting in study groups to discuss aspects of their assignments and their progress, as well as strategies for any problems that may have occurred.

Another option is for students to meet one-to-one with a support person. Just as a chief executive officer can benefit from having a coach, those with executive functioning issues can find it helpful to have someone to support them on their learning journey. Known in some circles as an accountability partner, this can be a peer, a mentor or a coach. According to Ahmann et al. (2018), having a coach or study partner not only helps students stay focused and on track, but can help raise their self-esteem and improve their personal well-being. Use of a coach has been shown to be particularly effective when the coach has received training beforehand and uses questioning techniques to help students find more constructive ways of working. Though training is beneficial, working with a peer can be one way of staying accountable without feeling dependent. The peers can meet in person or call each other to discuss their individual plans for a set period. They then work during that time and meet or call each other again at the end to check on progress.

Having a peer support system has been the most effective solution for my executive functioning issues – both in study and in work situations. A friend and I call each other, discuss our plans for the allotted time and then later measure our progress. To avoid embarrassment, I work hard to achieve all I said I would. I wish I had thought to use this method with this article.

Technology use

Advances in technology have led to a vast array of computer programs and apps that can both help and hinder effective learning. Students should be introduced to and encouraged to use assistive technology, a form of technology designed specifically to assist with learning. Smart phones and watches, voice recorders and electronic organisers can be used to issue reminders, record messages and help organise appointments to ensure they are not forgotten (Dewar et al., 2014). Other apps can help by allowing users to specify times on each website used, block websites that are overly distracting and provide mindfulness bells to bring attention back to the task at hand (Ester, 2016). Given the high levels of technological literacy in tertiary students, many will already be using some form of technology to assist with their studying and can therefore share details of apps or programs they have found useful.

Technology is a nightmare for me. Over the many years I have studied, distraction has caused me to lose countless documents. Even with OneDrive and its wonderful auto-save feature, I lost hours of work I had done on this article. I obviously still have a lot to learn.

Memory training

Learning and processing new information becomes even more of a challenge for those experiencing issues with working memory, the memory system that holds information temporarily while you are doing a task that needs it. We use it for a variety of tasks including to follow instructions, recall rules of games and remember the details of what we have just read in order to follow the ideas and/or story. Without a functional working memory, studying successfully is considerably more difficult. For those who experience memory issues, it can feel like the required information has gone in one ear (or eye) and straight out the other, leaving them feeling lost, frustrated and embarrassed. Learning strategies – such as the use of mnemonics and mental imagery (Carretti et al., 2007) – and use of assistive technology can help compensate for issues in this area. There are many claims that working memory can also be permanently improved using memory games and online brain training exercises; however, the results of research in this area are controversial and contested (Makin, 2016).

I have been writing for hours. I can see that the structure of my writing needs work, but my thoughts are going round in circles, as well as flying from the past into the future without so much as a stopover in the present. I know my mind needs a rest in order to see more clearly. In the past, I tried meditation without much success, and then I found mindfulness.

Mindfulness

When living with chaos, a sense of calm is one of the ultimate goals. Yet, many chaotic minds struggle to stay in one place. A mindfulness practice can help by enhancing attention, helping to provide balance and increasing self-efficacy (McCloskey, 2015). Mindfulness is the practice of staying present in the moment and focusing on your senses rather than letting thoughts wander into the future or languish in the past. The practice gives the brain time to take a break from relentless cycles of worry and rumination. McCloskey found that a regular practice could help students focus on their feelings and find ways to manage them without getting distracted. In research on the use of mindfulness in higher education, Mackenzie (2015) found additional benefits included better sleep, improved mental well-being, greater creativity and better academic results.

CONCLUSION

> Education … is not the learning of many facts, but the training of the mind to think.
> – Albert Einstein, *Einstein: His Life and Times* (1948)

Using the mind well is the foundation of education. The executive office scenarios at the beginning of this article are analogies of the extremes – functional and dysfunctional. Yet, all head offices need some form of training to give them the best chance of success. While sometimes that training needs to offer general office management skills, at other times it needs to be focused on specific administrative elements such as organising materials or setting priorities.

Issues in the executive functioning area of the brain can be a major impediment to academic success at a tertiary level. However, if students and teachers are made aware of these issues, they can be addressed on both an individual and group level. Using ako, strategies can be introduced and discussed, enabling students to learn different ways to deal with challenges they encounter on their learning journey, as well as share ideas that help others.

Whether it is through a weekly meeting with a coach; using assistive technology; learning memory techniques; practising time management; or simply finding ways to find and file information, identifying strategies for success can make the difference between a functional head office and one where things rapidly fall apart. While stress is an almost inevitable part of both study and life, it does not need to mean the difference between success and failure. Stress-reduction strategies, such as a regular mindfulness practice, can improve focus and increase mental well-being, offering a greater chance of academic success.

As usual, I work right up to my deadline. Despite the lost words and time, frustration and exhaustion, I feel that I have learned a lot about my executive functioning issues from writing this article, and I know what to do differently next time. Whether I do it or not remains to be seen. Nevertheless, even though I often curse my chaotic mind, I have developed greater acceptance of it. As philosopher Friedrich Nietzsche once said in Thus Spake Zarathustra*, "One must have chaos within to release a dancing star."*

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I would like to acknowledge Erina Hunt for the ideas, inspiration and support she has given me in writing, research, teaching and learning practices, including in the early stages of this article. Though sadly she is no longer here to guide, Erina enabled me and many others to find strategies and strength to deal with the challenges. As such, she remains a guiding light.

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Article

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LEARNING ANALYTICS FROM A NEURODIVERSITY PERSPECTIVE: CONSIDERATIONS FOR A CO-DESIGN PROJECT

Amy Benians

INTRODUCTION

This article takes a fresh look at learning analytics to consider the learning needs of neurodivergent students. Many neurodivergent students have 'executive dysfunction,' leading to problems planning, prioritising and organising their study. First, current research linking executive function (EF) of the human brain with taught strategies known as "self-regulated learning" (SRL) is used to establish a connection between these disparate fields of research. Then SRL interventions used in a classroom setting are considered in a computer-based learning environment. Finally, recent research in these fields is brought together into recommendations for design of a new learning analytics tool.

MEETING THE NEEDS OF NEURODIVERSE LEARNERS

Mirroring our natural genetic diversity, as humans we are also neurologically diverse. While the term "neurodiverse" was first coined by the autism community to differentiate themselves from the "neurotypical" mainstream, it now encompasses numerous conditions that can affect learning, including: attention deficit hyperactivity disorder (ADHD), ASC (autism spectrum conditions), dyslexia, dyspraxia, dyscalculia, dysgraphia, Irlen Syndrome and SLI (specific language impairment). The neurodiversity movement recognises that neurodivergent individuals bring strengths, often taking different approaches, with unique, creative problem-solving abilities (Rentenback et al., 2017). Currently in tertiary education, neurodivergent learners are grouped with our disabled learners. This is because, under a "social model of disability," they are disabled by the many challenges and barriers they experience to their learning under the current education system (ACHIEVE & TEC, 2021, p. 16).

As educators, we need guidelines to help us enable our neurodivergent learners to achieve their potential to make valuable contributions to our educational institutions, communities and their future workplaces. Current, research-informed guidelines are to follow the three principles of Universal Design for Learning (UDL) (International Disability Alliance, 2021, p. 16). The three UDL principles involve providing students with different options for:

1. Representation – for example, in display of content, using different types of media (audio, video, text) and visual aids
2. Action & Expression – how the student interacts with instructional materials, and demonstrates their learning for assessment purposes
3. Engagement – to show the 'why' or relevance of the learning, to keep students motivated, engaged and developing skills in self-regulation (Meyer et al., 2014; CAST, 2018).

These principles are mirrored in Mirfin-Veitch and colleagues' (2020) detailed overview of the learning needs of neurodivergent learners, with recommendations to:

1. Adapt learning environments for inclusivity (physical as well as relational environments, with care taken with timetabling, time structuring of instruction, and extra time allocation, where needed)
2. Adapt curriculum and the instructional or learning and teaching methods used – for example, using UDL
3. Embed classroom strategies to create safe, inclusive learning environments, with an emphasis on relationship-building (tutor and peers) with neurodivergent learners
4. Promote student agency, self-regulation skills and strategies, and self-management of behaviour (Mirfin-Veitch et al., 2020).

There is much learning design work yet to do at the level of programmes and courses to address the first two points. However, for the latter two points, efforts are often limited to time spent in the classroom and by the finite resource of our teaching and learning support staff. As more time is spent learning online, we need to better harness technology to offer neurodiverse learners the extra support they need to plan their learning, manage time and develop all-important skills in self-regulation and behavioural management.

THE CURRENT STATE OF PLAY

To date, innovations in the use of computer-based learning environments (CBLE) to support neurodiverse learners have been surprisingly limited (Mirfin-Veitch et al., 2020, pp. 25–26). There are various freely available assistive technologies and accessibility tools (for example, for authoring online content), and diagnostic (for example, for dyslexia) and proprietary (pay-for-access) software, which are outside the scope of this article.

Instead, this section will briefly describe the current state of learning analytics in the author's institution's learning management system (LMS), Moodle. Moodle is an open-source eLearning platform, enticingly allowing for potential collaborative design and development innovations (Christie, 2022). However, learning analytics are underutilised. Vast amounts of data from students' day-to-day interactions are collected on computer servers. This big data approach contributes to an underground aquifer of untapped information. Valid concerns around consent, surveillance, student privacy and data security have restricted our use of learner analytics to date. Also, designing suitable 'bore holes' to tap into this vast aquifer depends on the questions we wish to ask, who is asking them and the purpose of interrogating this data set.

A traditional 'by student' approach is to use learner analytics to identify at-risk students. For example, a pilot research project is underway in the University of Canterbury's Moodle LMS to identify at-risk students and to notify relevant staff (personal communication, Rachel Cash). Goode and colleagues caution against a 'by class' approach to use learner analytics to compare teaching from a performance review approach (Goode et al., 2021). Indeed, learning analytics should never be used as an evaluative performance measure of either staff or students, and care must be taken not to collect data that may be used to perpetuate existing societal biases or inequities (Selwyn, 2019; Goode et al., 2021).

Learning is a key part of learning analytics, and should be a primary driver in the design of such a system (Gašević, 2015; Selwyn, 2019). Learning differences and support needs of neurodivergent learners are varied, but all learners across the neurodiversity spectrum can benefit from the development of self-regulated learning (SRL) skills and strategies (Meyer et al., 2004; Mirfin-Veitch et al., 2020). SRL is a learned skill that can improve student performance (see Zimmerman, 2008 and references therein).

WHY NEURODIVERGENT LEARNERS BENEFIT FROM SELF-REGULATED LEARNING

This section explores the connection between self-regulated learning, executive function and neurodiversity. A shared feature of neurodivergent brains are differences in executive function, which controls processes such as planning, goal setting, organising, memorising, starting or changing an action, and self-evaluating. These executive processes occur in distinct areas ('nuclei'), largely found in the prefrontal cortex (Pennington, 1997), but also scattered throughout the cortex and subcortical brain regions (Bernstein & Waber, 2007). The executive function circuitry integrates information from past and present to inform future plans, which is held in the "working memory" (Hofmann, Schmeichel & Baddeley, 2012); imagine a two-way traffic system between nuclei in the frontal cortex and relevant subcortical areas (Bernstein & Waber, 2007).

Many of our neurodivergent learners (10–15 percent) have dyslexia, which is traditionally associated with reading and writing difficulties. People with dyslexia also score significantly lower in executive function tests, particularly of their working memory (Varvara et al., 2014). Like dyslexia, ASC and ADHD are also neurodevelopmental conditions. A meta-analysis found that, compared with neurotypical controls, people with ASC showed lower levels of performance in all executive function domains, particularly working memory, concept formation, response inhibition, fluency and planning (Demetriou et al., 2018).

Similarly, Willcutt and colleagues found that people with ADHD showed lower levels of performance in all executive function domains, most significantly in their working memory, response inhibition, vigilance and planning (Willcutt et al., 2005). The authors conclude that while executive dysfunction plays a major role in characteristic behaviours of ADHD, such as distractibility, impulsivity and inattention, it may not be causative of this strongly heritable condition (Willcutt et al., 2005). Importantly, 5.3 percent of children have diagnosable ADHD, but this decreases to 2.5 percent of adults (Faraone & Larsson, 2019). This shows that, as people with ADHD approach adulthood, there is a restoration of executive function, speculatively due to a combination of learnt strategies and neurocognitive compensatory mechanisms, or a removal of stimuli causing pathological stress in ADHD brains in childhood and adolescence (Hess et al., 2018).

A literature search for learnt strategies to enhance executive function leads directly to teaching students to become self-regulated learners (Schmitz & Wiese, 2006; Stoeger & Ziegler, 2007). Self-regulated learning has three subdomains:

1. Metacognition – of the mind. Metacognition involves knowledge about how one thinks and learns, leading to control and monitoring of one's thinking and learning strategies (Dinsmore et al., 2008; Roebers, 2017)
2. Self-regulation (SR) – of the interaction between self and environment. SR is broadly defined as goal-directed behaviour, with active monitoring of one's thoughts, emotions and behaviours; one's motivation and one's capability to achieve the set goal (Hofmann et al., 2012)
3. Self-Regulated Learning (SRL) – this is the application of metacognition and SR in an academic setting; that is, the choice and deployment of different study skills and strategies to achieve learning goals, with self-evaluation and a help-seeking component (Zimmerman, 2002).

Each of the above terms has a common metacognitive core whereby self-aware individuals use monitoring to gain control over their thoughts and actions (Dinsmore et al., 2008, p. 405).

ESTABLISHING THE LINK BETWEEN EXECUTIVE FUNCTION AND SELF-REGULATED LEARNING

In the following section, I will show that executive function and self-regulated learning have considerable overlap, and that executive function processes lead to self-regulated learning. That is, SRL is an application of executive function in an academic setting. Educational research is often fragmented, with different researchers using different terms for quite similar concepts. This divergence is seen with the concepts of executive function, which is rooted in neuroscience, and self-regulated learning, which has grown out of educational psychology and been

developed by social cognitive scientists such as Albert Bandura. Recently, researchers have joined the dots between EF and SRL. Miyake and colleagues (2000) used latent factorial analysis to clearly define three executive function processes:

1. Working memory (planning, prioritising, initiating and memorising)
2. Inhibition (focusing, avoiding distractions and impulsive behaviour)
3. Task-switching (also called "shifting").

Hofmann and colleagues (2017) examined these processes under a self-regulation lens and concluded that all these processes led to self-regulation. Hence executive function "subserves" self-regulation, which, broadly speaking, is goal-directed behaviour (Hofmann et al., 2017, p. 4):

1. When setting out to achieve a goal, the working memory needs to hold all possible options, integrate this knowledge with the current context and select an optimal strategy, then maintain the strategy until the goal is completed
2. Inhibitory processes are needed to keep an individual on task and on track
3. Task-switching may be required – for example, to stop and eat, then to return to achieving the set goal.

Hence strong executive function serves up good self-regulated behaviours. In contrast, metacognition is the "master" that exercises control over executive processes (Roebers, 2017). For example, we can learn new strategies to enhance our working memory, then use metacognitive strategies to monitor and control use of these. As illustrated by the author, each executive function process has a monitoring–control metacognitive loop (see Figure 1). In the figure, self-regulated learning with its metacognitive monitoring–control loop is shown at the same level as, but distinct from the three EF processes.

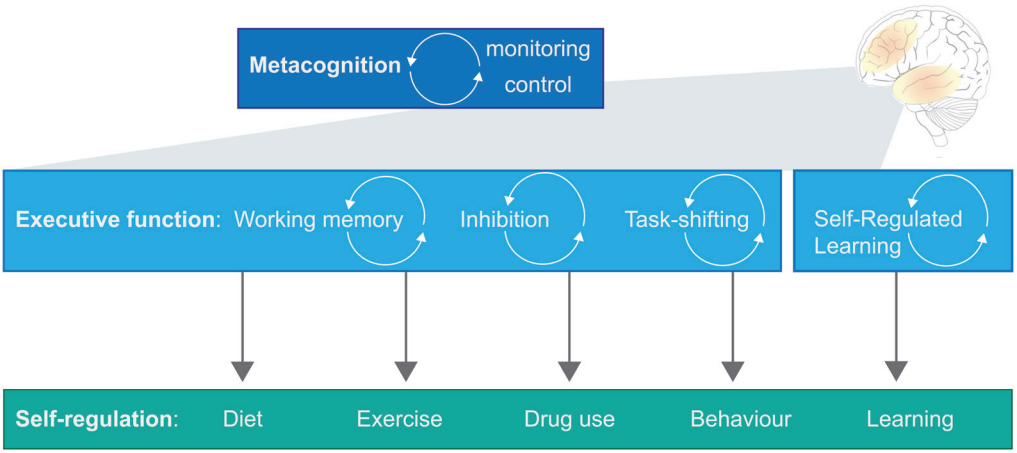

Figure 1. Schematic by the author to show the hierarchy of metacognition, executive function and self-regulated learning. Metacognitive processes of monitoring and control (shown as curved arrows) are used to attain mastery over EF processes (Roebers, 2017) and SRL strategies (Dinsmore et al., 2008). Hofmann et al. (2017) describe how the EF processes in turn subserve self-regulation, which is exerted in the different contexts shown.

Each executive function process contributes to self-regulation (SR), a phenomenon which has been researched in many contexts, from control of diet to alcohol and drug use. Here we are primarily concerned with SR in the academic context, which can be taught through SRL and leads to learning.

Effeney and colleagues (2013) attempted to test empirically whether self-regulated learning is a "contextualised application" of executive function. They studied both constructs in adolescent males, at different ages, in an Australian all-boys high school. They found that the boys' self-reported measures of EF and SRL were strongly correlated. Measures of executive function are known to increase during adolescent development, and the boys' self-regulated learning scores closely followed the EF increases, suggesting adoption of learnt SRL strategies as they progressed in the strongly academic setting. While their results confirm a close overlap of the EF and SRL constructs, the study size was too small to draw conclusions around directionality, and the authors raised concerns about the weaknesses of retrospective self-regulated learning surveys (Effeney et al., 2013).

Importantly, the convergence of the previously separate executive function and self-regulated learning research fields allows EF and education researchers to tap into the vast literature on SRL in computer-based learning environments (CBLE).

SELF-REGULATED LEARNING AS AN INTERVENTION

The focus of this article now returns to how to use learning analytics to guide development of self-regulated learning. Can we use CBLE to make contextualised suggestions about when to use certain strategies over others? Can students engaged in self-directed learning use self-monitoring tools in CBLE to better control their learning?

There is good evidence that classroom interventions are effective in developing self-regulated learning at university level (Schmitz & Wiese, 2006) and at primary school (Stoeger & Ziegler, 2007). The challenge is to transfer SRL interventions into a CBLE, to support and guide neurodivergent learners who may have lower scores in working memory (motivation; time management; planning); inhibition (hence decreased attention spans), task switching and their overall self-regulation abilities (Mirfin-Veitch et al., 2020; Alasalmi, 2021).

Zimmerman acknowledges that different self-regulated learning strategies are activated at the beginning (forethought), middle (performance) and end (self-reflection) in a sequence of learning (Zimmerman, 2002, 2008). Schumacher and Ifenthaler (2018) found that many of students' expectations of learning analytics spanned Zimmerman's three distinct learning phases:

1. Forethought phase: Requires tools for scheduling, planning (for example, checklists), maintaining motivation, personalising recommendations and for setting goals (for example, clear learning outcomes and objectives)
2. Performance phase: Requires tools to assess competency and skill development, such as auto-marking quizzes, recognition of offline and social learning, and opportunities for self-assessment
3. Self-reflection phase: Requirement for results of assessments with timely and valid feedback, and a learning management system-wide awareness of a student's "current state of knowledge, their activities in the system as well as their progress towards own or set learning objectives" (Schumacher & Ifenthaler, 2018, p. 70).

Based on promising research using self-regulated learning in computer-based learning environments, there are good indications that students can be guided towards SRL using learning analytics. Selected studies are described below so a picture of a future learning analytics system might emerge:

- Not surprisingly, only certain learning analytics data are positively correlated with student achievement. These are: number of logins, interaction with online activities and participation in discussion forums (Gašević et al., 2015). The display of distracting, redundant information, such as time spent online, should be avoided.
- Use of specific, task-related tools such as Turnitin's similarity checker was positively correlated with achievement in a writing task (Gašević et al., 2015). SRL tracking should incorporate measures of students engaging with specific, task-related tools.
- Hadwin and colleagues found that students' "metacognitive monitoring" can be tracked by plotting transition graphs and measured using graph density (Hadwin et al., 2007). Importantly, the metacognitive monitoring

scores *decreased* when students were less invested in the task. The recommendation is to follow metacognitive monitoring, as it is a central SRL process – but note that this needs coupling with measures to assess the quality of student work produced (Gašević et al., 2015).

- In regard to the above point, promising advances have been made using Coh-metrix text analysis to automate assessment of students' writing for cohesiveness and comprehensibility (McNamara et al., 2014). This opens up the potential for students to receive feedback on their writing, prior to assessment submission, where feedback has been a major expectation of students from a learning analytics system (Clouder et al., 2017; Schumacher & Ifenthaler, 2018). Self-regulated learning tracking should compare the SRL strategies used with student achievement data, and ensure that the student need for automated feedback is met.

FURTHER CONSIDERATIONS FOR DESIGN OF A LEARNING ANALYTICS TOOL

How this learning analytics data will be displayed, accessed and visualised by students is another active area of research (Verbert et. al., 2013). While Verbert and colleagues describe fully customisable dashboards, Zimmerman (2008) envisions heat maps to guide a student's SRL choices. There is the prospect of even more accessible options, such as a Moodle ChatBot (Karmali, 2018).

Taking a student-centred approach, the first consideration in design of a learning analytics tool is that it keeps learning at the forefront. One way to achieve this is to develop students' skills as self-regulated learners (Zimmerman, 2002, 2008), as expanded upon in this article. Secondly, a learning analytics tool should be co-designed in partnership with students, in particular with disabled students as described in the redeveloped Kia Ōrite Toolkit (ACHIEVE & TEC, 2021). Thirdly, a learning analytics tool needs to be accessible, customisable and optional for students. Rangatiratanga is the fourth pillar of Angus Macfarlane's Educultural wheel (2004), alongside manaakitanga (an ethic of caring), whanaungatanga (relationship building) and kotahitanga (unity and togetherness). In political terms, rangatiratanga is the right to exercise authority, independence and self-determination and, in an educational context, has come to mean student autonomy and exercise of agency (Macfarlane, 2004). Applying the rangatiratanga principle to learning analytics, a student should be able to opt in, as Selwyn states: "rather than students being permitted to 'opt-out' of using learning analytics systems during their school or university studies" (Selwyn, 2019, p. 16).

Rātima and colleagues place the student's wellbeing, oranga, at the centre of the Educultural wheel (2022). A powerful model emerges where a student becomes a co-designer in their learning experience and leads to increased student agency, ownership of learning and enhanced student wellbeing (Rātima et al., 2022).

CONCLUSIONS

Surveys of students spanning the neurodiverse spectrum show they have realistic, valid expectations of learning analytics that support their learning (Clouder et al., 2017; Schumacher & Ifenthaler, 2018; Alasalmi, 2021). In our bicultural context of Aotearoa New Zealand, we need to move away from traditional 'performative' models of learning analytics towards a 'formative' model that guides and supports learning for all students.

As proposed in this article, a learning analytics tool should be co-designed in partnership with students, including neurodivergent and disabled students, who should be financially compensated for this work (Kia Ōrite Toolkit). This – the author hopes – could lead into an exciting collaborative project to design a prototype feature or plug-in for Moodle.

In the classroom, the learning differences of our neurodivergent learners need to be understood, acknowledged and accommodated by empathic and compassionate teachers. Similarly, learning designers and educational software developers need to cater first to our underserved learners, who are often disabled by the learning environments they must operate within. The adage that what is good for disabled learners is good for all applies equally in computer-based learning environments.

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REFLECTIONS FROM TWO NEURODIVERSE LEARNERS THRIVING IN LEARNER-CENTRED DEGREES

Steve Henry and Deane Patterson

In this article, two learners in self-directed degrees based in the workplace reflect on their experiences in learning from each other and in communities of practice. Deane and Steve will each introduce themselves and their relationship to learning through their neurodiverse lenses. Then they explore designing for inclusion in formal education through the three dimensions of Student Centred Learning: humanism, cognition and agency (Starkey, 2019). They explore "ako," which in te reo Māori means being in a reciprocal learning relationship where teachers are not expected to know everything. In particular, ako suggests that each learner brings knowledge with them from which all are able to learn (Keown et al., 2005). Their discussion is transcribed from a speech-to-text app because both speak better than they write.

INTRODUCTIONS

Deane: I'm Deane Patterson, a recent graduate of the Bachelor of Leadership for Change (BLFC) and current Master of Professional Practice (MPP) learner at Otago Polytechnic.

I was working in the online education space and seeking to enhance my teaching skills. I was assured I could learn anything I wanted – the BLFC programme is based on self-directed learning and your own professional practice.

The first thing that impacted me was consciously accepting and interacting with a wide range of cultures, temperaments and viewpoints. A facilitator and a learner whom I connected with both frequently referred to their autism/neurodiversity. Not in an "I'm disabled, please forgive/excuse me" way, but rather from an "I think and act differently – have you considered how things look from here?" position.

My awareness of my ADHD began while I was in the BLFC, as two of my four kids started getting counselling and medication for ADHD and other neurodivergent behaviours. But despite all this being around me, it was only by chance I watched a YouTube video (How to ADHD, 2018) that listed behaviours (for example, hyper-focusing, attention deficit, object permanence) and I began to recognise my own patterns.

I'd never considered myself in this light, but the labels fit well and went a long way towards me understanding why I felt and acted differently. Because I already had a strong community with peers in the BLFC programme, there was no shame for me. Rather it was a chance to have a fresh look at my personal and professional life.

My greatest transformation was moving from a need to be 'the expert' to being a collaborator: a practitioner who is simultaneously a learner and teacher.

I began to realise I had abilities that allowed me to better see things from an end-user perspective than my colleagues. I could quickly distill the big picture, and then develop the essential ingredients to simplify or strengthen communications and products. Helping others with these skills did not require me to be 'the expert' or even the leader. I could complement my co-workers with a unique perspective and set of experiences.

The freedom to think, operate and relate in a learner-directed ako programme meant there was acceptance and space to develop the positive sides of my differences. I also received better supervision from having facilitators who understood neurodiversity, and a programme that had the latitude for my diversity to be an advantage to me, not a disability.

I'm currently enrolled in the Master of Professional Practice programme (MPP) to redesign my professional practice with these new, and clearer, perspectives at the forefront.

Steve: I'm Steve Henry, a facilitator and doctorate learner at Capable New Zealand, part of the College of Work Based Learning at Otago Polytechnic, Te Pūkenga. Deane and I first met in 2018 and we have journeyed in learning together through the BLFC and MPP programmes, with me as his mentor–facilitator in those programmes until the present (June 2022).

I identify as neurodivergent, with high functioning autism, or "awesomism" as we call it in our whānau. This is something I learned about 15 years ago, when my youngest son was diagnosed as autistic and my eldest son with ADHD. Realising they are mirrors of my own neurodivergence, I have learnt so much while holding space for them. Each person's perspective and how they can reach their potential has become a career focus of mine, as those who are different may get marginalised. Those who are marginalised watch from the edges, often feeling belittled, othered or alienated (Berryman et al., 2015). I have sought to make a space for such learners.

I'm in my fourth decade as a professional educator, and over that time I've changed immensely to adjust and cope with the way education is perceived, changed and delivered. My early years were spent with learners who failed in mainstream formal systems in alternative education and since returning to the mainstream, I have always been drawn to develop programmes that are inclusive, particularly of the marginalised. When I am invited behind the walls of their trauma, I can see that they just didn't fit – just like me. I had spent most of my career developing programmes for learners who are neurodiverse without knowing it, until relatively recently. In 2016, I was a part of a team that had the opportunity to design the Bachelor of Leadership for Change (BLFC) – a capability degree rather than a subject specific degree. If you stop and consider what capability means, it must have students at the centre because it's up to them to determine their capabilities in their context, and hence their curriculum.

I'm currently completing the Doctor of Professional Practice and am a facilitator on the Master of Professional Practice (MPP). I'm having a look at me as an educator, with my changing narrative of being the extrovert, the expert, the clever one, through to now being one who really designs for learners to be accepted, no matter what culture they come from. My doctoral research is showing that sensemaking is a highly desired output for learners generating meaning (or purpose) from reflection on their experiences.

I find neurodiverse learners are a mirror for me to be accepted for being unique. And as I found and navigated my way to being a facilitator, rather than a teacher, I found a freedom in supporting learners who are curious and interested in learning with a principal focus on reflection on their experience. This means a learner cannot 'fail' – only reflect insufficiently at the right depth to meet the level of the degree they are studying.

EMPOWERMENT AND SHOWING UP

Deane: The very first thing about Starkey's model (Figure 1), reading from the top, is participation and empowerment. And I think participation without empowerment was my experience of high school. When they [high school] said "participation," I felt that meant, "Answer the right questions. Give us the memory dump to prove that you're listening." But I think the BLFC puts participation and empowerment together. Yes, it's more volatile. We've seen that in class. But it's also where you get the most dynamic shifts and transformations because people collide and have to figure out: "Do I believe what I believe or am I going to change the way I think about this?"

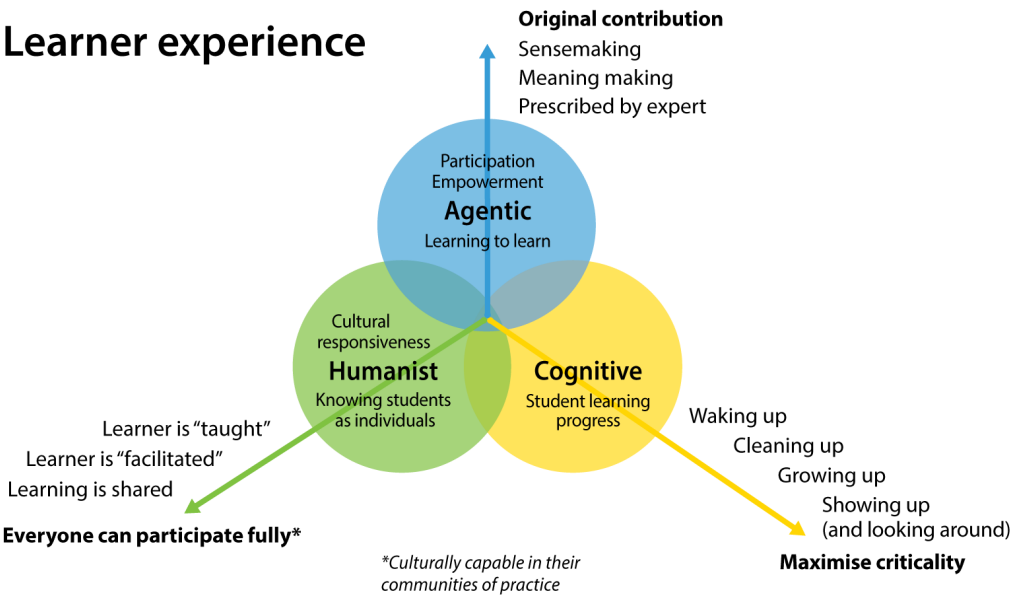

Figure 1. Dimensions of student-centred learning development (modified from Starkey, 2019).

Steve: So, the power of having diversity in a community of practice, or a class, which is acting in ako, is that there's always a question being asked. What am I in relation to this? Yeah, I'm witnessing this thing going on in front of me. Do I dismiss it from my old default paradigm? Am I willing to look at it through their lens? What is the lens?

Deane: Ako needs both [empowerment and participation]. You and I and others have had really great classes. And then there are all the students I've never met. They've never shown up for a single class. I wonder what their experience was like. Do they do well on their own? Maybe some people do?

Steve: Yeah, [they do]. I mean, both the MPP and the BLFC are *independent* learning programmes, which means maximising agency for the learner, so it's up to each learner. Some people are lone wolves and prefer to work alone and can achieve high things alone. I think you and I have spent many, many years doing that as experts working [alone]. Actually, my big breakthrough was to realise that one plus one equals three when it comes to sharing expertise. So, there is this idea of cognitive progress. How do we measure? In the traditional approach it would have been around how much knowledge you have, but I'm of the view that being able to maximise our criticality is the key measure of success. If I can look at my own narrative in a new light, or my own practice in a new light, then I'm succeeding. I do like Ken Wilbur's (2016) Integral theory for examining the phases of waking up, cleaning up, growing up and showing up. All of these may be occurring simultaneously.

I need to wake up to my patterns. I need to clean up the mess that's getting in the way of me participating in the way I'd like, such as not believing in myself as an expert or not validating my own view or feeling left out or on the fringe. Or, [believing] that my view is not valid and dismissing it. I think growing up for me is to realise that my mind's neurodiversity means I see things differently and earlier than others. So I have to be very patient if I want to participate in learning communities and accept that other people are bringing other things that I can't necessarily understand. That enables me to show up in a new way without judgment and with much more curiosity about myself and others.

Deane: According to Robert C. Barkman (2018):

> When you see a pattern, it can change your life. Seeing a pattern can even make you smarter. Recognizing a pattern is like looking through a telescope for the first time. As if with new eyes, you see things that you have never seen before. That same experience can happen when you see a pattern for the first time.

Without the participation of others, I could not see my own patterns because I had nothing else to compare to. Knowing that you were openly neurodiverse and having a classmate who was neurodiverse made me stop and say, "Well, what's different about you then?" Then I began to see things and started observing, "Oh, I do that. Oh, I do that too! I wonder …" Then observing by contrast people who are not neurodiverse, I think, "I don't function like they do," and my patterns begin to emerge. But when I operate without collaboration all the time, and there's nothing or no one to compare my work with, I'm never going to see those patterns and I'm doomed to repeat cycles. I believe my patterns of behaviour [in the past] were not productive and I have not been as successful as I should have been.

AGENTIC AND HUMANIST LEARNING

Steve: If we look at the whole humanist idea that the learner is at the centre, and this idea of [being] culturally responsive to know students as individuals, then surely one of our responsibilities as an educator is to understand the diversity that the learner brings, because actually all learners bring diversity.

Deane: And that's the point of an ako practice. That everybody brings something, and everybody shares something. It's clear how this is reflected in the agentic dimension.

Steve: Yes. And there is this progression. How do you get to the point where everyone can participate fully? Because there are so many layers of trauma and conditioning around the risk of showing up and being put down for it and excluded and marginalised. There's no question that the marginalised have suffered in our formal education system to date when learning as 'prescribed by an expert,' because they don't fit the bill of what someone else decides their learning should look like. As soon as this is dropped, that's when you move to a shared learning or ako model. Then you get to a point where you begin to explore the value each person's bringing. And the perspective they bring is valid.

This piece about being agentic is really important. It relates to the Māori concept of tūrangawaewae and the place I stand strong, or the Welsh concept of Cynefin, which is about this idea of my purpose, my unique perspective and sensemaking (Snowdon, 2002). If your sense is *prescribed* by an expert – for example, "this is the way you should be doing it," versus how I'm finding meaning by creating my own purpose and meaning – then the difference between meaning-making and sensemaking as I understand it, and in the literature, is that meaning-making has to do with purpose. Once your purpose is clear, then it's about sensemaking in coherence in order to get to what I consider to be the highest actualisation. If everyone contributed originally, then there would be no need to 'fit in.'

DESIGNING FOR INCLUSION

In light of this, let's talk about the design of the Bachelor of Leadership for Change and the Master of Professional Practice. These courses are highly humanist because each diverse learner's experience is highly valued. We want the original contribution from each participating learner and this maximises the agency of the learner, who has the power to decide what is important. We want people to maximise their criticality and we want everyone to participate fully in their communities of practice. So that means only *they* can prescribe what their context and community is. Not someone else. For me, this is why the neurodiverse struggle so much in formal education, trying to fit someone else's inflexible design. Similarly, their version of what is original must be up to them and how they make sense of things. And you know, the role of the facilitators in the program is to gently enable people to wake up to their patterns. By witnessing themselves in communities of practice, learners often surprise themselves and deepen their reflection as they wake up to what is really going on for them.

Deane: One learner I interviewed formally for my BLFC research said: "This [BLFC] program is what high school should have been!" I keep unpeeling new layers of that and being really intrigued. One of the things that really helped him was this agentic idea of learning to learn and being told, "You might learn differently. Let's explore different ways that you can learn, research, and frame ideas." That was a transformational idea for them.

Steve: I think this "aha" and surprise of the non-linear experience model is crucial for breakthroughs in transformation. Having a disorientating dilemma is needed for transformational learning (Mezirov, 1997). We are not talking about incremental capability development here, or incremental knowledge development. We're talking about breakthrough. And we're talking about perspectives changed through transformational learning (Mezirov, 2000). Agency has been described as the force or compass that drives the transformation (Green, 2021).

Deane: I never really remember there being a great distinction between personal and professional transformation in the BLFC. I think they go hand in hand.

Steve: I have little distinction between my personal and professional change because I strive to be authentic wherever I am. So when I am able to show up without fear, then I can clarify my own purpose rather than the one imposed on me by my conditioning. I can then refine my purpose and have it meaningful and then make sense of it. This sets the scene for me to discover my original contribution and have the power to do so. The other dimension is cognitively comprehending, no matter the source of knowledge or values in the context. For both you and me, learning appears to be a natural phenomenon which maximises criticality. How well can I see my and others' perspectives without agenda and be present to the phenomena I am a part of? (Van Manen, 2007).

An often invisible aspect of formal learning is whether the design can enable everyone to participate fully. My experience is changing because of the design of learner-centred degrees I feel lucky to participate in as a facilitator and as a learner. The New Zealand Disability Strategy states that

> Disability is something that happens when people with impairments face barriers in society; it is society that disables us, not our impairments, this is the thing all disabled people have in common. It is something that happens when the world we live in has been designed by people who assume that everyone is the same. (Ministry of Social Development, 2016, p. 12)

I face barriers and am therefore disabled. That's quite a difficult thing to say (or write), since I feel so able in so many ways and this is the first time I have said it out loud. This article was generated through a voice-to-speech application, so the barrier to creating an article like this is reduced. This tool helps me overcome one of my writing disabilities in using such formal language. The BLFC and MPP were designed with this flexibility in mind, so that the learner and their culture are at the centre. They are the expert in their learning, and the job of staff is to reduce barriers so learners can show up. Both programmes begin with extensive reviews of learning that

both honour the learner's uniqueness and enable the learner to become reflective about the experiences that have shaped them, so they can recognise their known and yet unknown perspectives.

FINAL REFLECTIONS

Deane: As part of my research for the recent reset of the BLFC programme, I had to ask, from a learner's perspective, how much does the learner need or want to be informed of the process:

> When students become reflective about the teaching and learning process, they are strengthening their own capacity to learn. Central to this is the principal of reflection as metacognition, where students are aware of and can describe their thinking in a way that allows them to 'close the gap' between what they know and what they need to learn. (Te Kete Ipurangi, n.d.)

Authentic agentic practice requires awareness of how the process works. So during the BLFC reset, the onboarding process for new learners places a strong emphasis on the value of a *community* of learners.

I do feel that Steve was a clear role model for me around disclosure of his neurodiversity and new reflections and investigation. But at no point did he or other facilitators imply facilitators were the 'standard' to be replicated. In ako practice, everyone contributes, and in authentic agentic learning, everyone must consciously develop their own meaning.

Steve: Groups amplify the individual experience. It's therapeutic to be witnessed by others who can relate, as it is to imagine a reader getting value from sharing our experiences. Designing for inclusion is both our greatest opportunity for student-centred learning and a big challenge to overcome the assumption that people are different to how they appear. Deane and my relating shows we learn so much when we bring who we are as unique. I am so glad I am unique. It can be lonely, but more often than not I am glad to be in the presence of myself.

Steve Henry is a Tasman-based facilitator working for Otago Polytechnic's College of Work Based Learning. The focus of his doctorate is on making sense of his practice with marginalised learners in their transformation and agency.

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Deane Patterson is a Dunedin-based content creator with an extensive history in film and television. He is completing his Master of Professional Practice with a focus on developing a community of practice for musicians to enable them to access resources for thriving.

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MY JOURNEY AND THE VALUE OF A COMMUNITY WHERE NEURODIVERSITY IS CELEBRATED

Rachel van Gorp

INTRODUCTION

The purpose of this article is to share some background about how I got into this educational space, my experience of being diagnosed with dyslexia and then disclosing myself to my peers at the inaugural Neurodiversity Symposium held at Otago Polytechnic in November 2021 as an adult academic. This provides a unique perspective on my experience as a neurodivergent individual in a neurodiverse world. I had no idea how much a community of practice, one in which I can learn, would help me grow, and how belonging to a community would make me feel valued, until I spoke at the symposium. This growth is something I am celebrating today.

BACKGROUND

School years

While at school, I involved myself in everything I could. However, while I enjoyed learning new skills and activities, I found myself running away from primary school as I could not understand what the teachers were saying. I always seemed to not quite get what the teachers were talking about. This made me frustrated, it left me feeling overwhelmed and lost. At that time, I never fully understood why I felt LOST! – and sadly nor did my parents.

At intermediate school and then high school, I noticed that I was learning at a different rate to my friends. Once again, I could feel myself getting lost in the crowd. My reading and attention were drifting in and out; trying to find a book to read for English was near impossible. I couldn't stay focused, yet I was expected to sit still and concentrate, something I was not very good at doing. I realised I could not hide any longer.

After gaining School Certificate, I left school in the first term of the sixth form. I was a high-school dropout, not that I thought that at the time. At that time in my life, I thought I had a plan; in reality, I now realise that I had no idea what I wanted to do with my life or where I wanted to be. All I knew was that I was ready to leave educational learning; with that, I entered into the world of retail.

Being neurodiverse did little to improve my confidence in my academic studies. Growing up not knowing why I did not learn the same way as others did little to help my belief in myself. It was not until my children were at high school that I decided I wanted to spend time working on my career. I decided to train to be a personal trainer and then a massage therapist, and thus I started on my first study in higher education.

I did not enjoy reading at school, so my biggest obstacle once again was getting back to the books. I was not sure how I was going to do this: undertaking academic work. I was determined to start and finish this learning journey; to complete the qualification especially, as I had left school early. With the help of my husband, who would proofread all my work before I handed it in, I achieved my qualification; I had done it.

Irlen Syndrome and dyslexia

I was diagnosed with Irlen Syndrome (IS) in a routine vision check-up. Irlen Syndrome is commonly defined as a perceptual processing disorder, suggesting that the brain cannot correctly process visual information due to sensitivity to specific wavelengths of light. Symptoms include poor concentration, difficulties with reading, writing and comprehension; glare sensitivity; headaches and poor depth perception. These are all symptoms I have experienced, and some are heightened if I get tired, overwhelmed or am under pressure.

I did not realise that I had a learning disability before receiving the diagnosis. I believed that all people saw words in the same manner, so I had not thought of investigating why I saw things this way or what effect this may have had on me throughout my education; I just accepted it. While investigating IS, I discovered that dyslexia often co-exists with IS (Australasian Association of Irlen Consultants, 2021). The more I investigated this, the more I thought I could also be dyslexic, which could explain why I have struggled with learning. I now have a pair of glasses with pink lenses that flatten the words out, stop them moving and let me concentrate for extended periods of time.

Diagnosis

Getting a diagnosis by going through an adult cognitive and educational assessment (ACEA) and recognising that I have many "workarounds" that allow me to cope led me to reflect on my capabilities rather than my deficits. For me to even get this ACEA was an obstacle in itself. I had to get in touch with SPELD New Zealand, then they had a certified tester email me; this took a few months to set up. For me this was worth the wait.

NEURODIVERSITY SYMPOSIUM

The exciting journey to the Neurodiversity Symposium coincided with my Master's studies, in which I had decided to explore how lecturers can create learning experiences that not only include and take account of the challenges faced by neurodiverse learners, but also utilise and enhance the capabilities that neurodiverse learners bring to the classroom. I then saw a posting on Tūhono advertising the launch of the Neurodiversity Symposium. Several of my colleagues suggested I express my interest in presenting, as it could provide an opportunity for me to share my experiences, my learning journey and the rationale for why I wished to pursue this topic in a Master of Professional Practice.

As part of the symposium, I publicly revealed my diagnosis of dyslexia and Irlen Syndrome, accompanied by colleagues and other like-minded individuals with an empathic ear, for the first time. Strangely, I found myself standing in front of a crowd doing this! I am a neurodivergent individual, and I will embrace it all.

Neurodiversity, according to Clouder et al. (2020, p. 757), is "an umbrella term" that encompasses many learning disabilities, such as "dyspraxia, dyslexia, activity deficit hyperactivity disorder, dyscalculia, autism spectrum disorder, and Tourette syndrome." They add that the rising number of learners with learning disabilities linked with neurodiversity enrolling in higher education presents a widespread and developing challenge for lecturers and businesses worldwide.

Deciding to present at this symposium was a big deal for me as I felt extremely vulnerable in opening up and telling people something so raw, sensitive and emotionally charged for me. I needed some time to reflect on this opportunity. After consulting with my husband and academic mentors, I decided to take this opportunity. I decided that it provided the ideal option for me to be exposed to a safe and comfortable environment surrounded by empathy and understanding. It also provided an opportunity for new learning. I knew there was no turning back once I decided to present. I had no idea at this stage that the Neurodiversity Symposium was

going to be a place where I would feel like I had been 'hugged' and 'valued' for speaking my truth, as I had always worked long and hard at hiding my 'weaknesses.'

Putting my presentation, including slides, abstract and bio, together and talking about myself was quite an exciting process. How much do I want to divulge? How much should I say? What did I want to talk about – just me or … more?

When designing my presentation, I used quotes from the literature on neurodiversity that I had discovered while studying for my Master's degree. I also added my own perspective and described the strategies I apply, referring to them as my "workarounds." I have developed these over the past 53 years to make myself appear to understand, to not stand out in a crowd in a negative way, or maybe conceal my lack of understanding.

As I put all of this together, I found myself wondering what my motivation was, and why I felt the need to tell my story now. Exactly why did I want to do this? Why was I willing to let go, to face colleagues, students and peers, and for them to see me in a different light? I was in it for the greater good. I want to share my story so that others can learn, and I can hear theirs. I want to educate, empower, encourage and care for others, and understand what I can do to help people achieve their full potential. I have a gift of encouraging people to open up to me. Therefore, this was something I had to do. This was my opportunity.

WHAT I KNOW FROM THE LITERATURE ABOUT NEURODIVERSITY AND DYSLEXIA

Some of the literature I have encountered in my research has been very insightful, and I have enjoyed reading that neurodiversity is and can be normalised. I have investigated what other adults have discovered about themselves and how they have accepted their neurodiversity later in life. I was interested to learn if they had found or created their own "workarounds."

In my research, I also found that neurodiversity is a relatively new term. Singer (1999) coined the term neurodiversity to refer to the fact that all humans have a unique brain, made up of our genetic heritage (Nature) and cultural and experiential memories (Nurture). Researchers Cameron and Billington (2017) discussed dyslexia in the United Kingdom, describing it as a set of cognitive or neurological deficits that affect one's reading ability.

Snowling et al. (2020) found that for many years researchers evaluated dyslexia as a specific learning disability – evident in the sense that it is difficult to explain using obvious causes (sensory problems or low IQ). However, the inability to identify significant differences in reading and phonological skills between dyslexic children and children with more general learning problems has caused this opinion to lose favour (Snowling et al., 2020).

According to SPELD New Zealand (n.d.), a specific learning disability is a combination of unexpected learning difficulties that significantly interfere with an individual's academic, work or everyday life activities. On the other hand, Mirfin-Veitch et al. (2020) believe any definition of neurodiversity should make it clear that it is not a diagnosis but rather a title that encompasses a wide range of specific, non-specific, hidden and/or undetermined diagnoses, such as intellectual disabilities (ID), communication disorders (CD), autism or autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD) and specific learning disorders (SLD).

Through my continuing research, I discovered Hayes's (2020, p. 41) findings that, from the 1960s to the 1980s, dyslexia was often dismissed. Dyslexia was once frequently referred to as a "middle-class disease." Parents felt that the blame fell on them for not helping their children with their studies. Hayes goes on to say that in the late 1960s, dyslexia was thought of as "educational nonsense," whereby middle-class parents made excuses for the lack of academic ability of their children. I'm not sure if my parents agreed with this. All I know is that my mother tried her best, and steered me towards sport, which I was good at.

Hayes (2020) outlines that in the 1980s dyslexia and other learning difficulties were finally recognised by the government as specific learning difficulties (SLD), resulting in funding being made available, along with statements of educational need regarding those who had been appropriately assessed and identified. From my own experiences, discovery and acceptance of dyslexia in Aotearoa New Zealand's education system was not a reality. I do remember some of my friends receiving additional support for reading. I must have flown below the radar, as this was never offered to me. These earlier interventions would have assisted throughout my schooling and may have resulted in my academic ability pathway being more straightforward.

From children's education to tertiary education

MacCullagh (2014) found that dyslexics and other learners with learning differences face significant challenges as a result of poor understanding and acceptance of their disability as a social construct. Recent literature discussed in this essay highlights the importance and value of supportive lecturers, mentors and coaches to improve outcomes for learners with neurodiversity. In their review, Waters & Torgerson (2021) documented pockets of the historical development of some interventional strategies used to support learners with dyslexia in higher education. The effectiveness of some or all the processes, particularly when it comes to in-class adaptations and mentoring, can only be established through further experimental research. This systematic review points to numerous surveys that raised concerns about student satisfaction, so there is a likelihood that problems persist in practice.

Aotearoa New Zealand researchers Dymock & Nicholson (2013) found that support from lecturers can make a significant difference to the life and learning of a dyslexic adult. Waters and Torgerson (2021) supported this finding by highlighting the importance of introducing mentors or coaches to improve learner outcomes. Adult learners with dyslexia must have someone who is there for them, who understands what it is like for them and who is willing to adapt their teaching to help them. MacCullagh (2014) highlighted the inadequate research into the participation and experience of learners with dyslexia in higher education. This participation is very important and, while lecturing, I have found myself including my personal experience by adapting my teaching style to help learners improve their outcomes, by giving the class some real-life examples.

After just completing an online course in phonological skills, I benefited from further guidance and understanding on the subject of breaking down sounds and syllables, skills I needed earlier in my childhood. How did I fall through the cracks, and why was this weakness not found early on? Maybe I should not go there in terms of 'why not,' but rather see it as: "I want to ensure young people do not fall down the cracks and that the right tests and measures are put in place at a much earlier age." These basic skills are so crucial in all areas of learning.

Recent research in educational settings within New Zealand has highlighted significant challenges for neurodiverse learners. Mirfin-Veitch et al. (2020) discovered that in Aotearoa New Zealand, a lack of understanding of neurodiversity in the schooling sector negatively impacts the lifelong educational experiences of learners labelled as neurodiverse.

Increased awareness

On the one hand, there is increased awareness that neurodiversity can be a barrier to young people being part of the drive "to build the world's best education system for all New Zealanders, and provide a range of different types of learning environments and settings to meet the needs of children, young people and their parents and whānau" (Hipkins & Martin, 2019, p. 4) – cited in the New Zealand Ministry of Education (MOE) learning support plan 2019-2025 that Aotearoa New Zealand is committed to building. There remains, nevertheless, a great deal of learning and understanding required about how to identify neurodiversity and, subsequently, how to meet the learning aspirations of neurodiverse learners.

Mirfin-Veitch et al. (2020) identified five key themes that emerged from a systematic process of identifying educational research that could provide easily implemented, low-cost, flexible supports for neurodiverse learners:

1. Prioritising and valuing relationships
2. Developing agency
3. Supporting learners' behaviour understanding and management
4. Creating inclusive environments
5. Embedding inclusive teaching strategies.

New approaches to and understandings of neurodiversity/dyslexia are explained by Stenning and Rosqvist (2021), who describe neurodiversity as a collective property of brains, as we attempt to negotiate between us what it is to be human and how we can work together to lead successful lives and lessen suffering. They propose investigating the implications of neurodiversity for autism research and that we unravel the analogy between neurodiversity and biodiversity (Stenning & Rosqvist, 2021).

Waters & Torgerson (2021) have advanced an argument for establishing and evaluating dyslexia-trained mentors. Several studies have discussed using a "learning catalyst" (mentor or coach) to facilitate learning during task execution. A third person in a role like this appears to help learners with specific learning difficulties. However, there are no published studies of a causal design that evaluate the use of mentors as a "learning intervention" using measurable outcomes. In my Master of Professional Practice (MPP), my academic mentors have taken on this role and are guiding me through the journey of completing my Master's. The results of their support have given me the confidence to believe in myself, to step out of my comfort zone, and trust that I too can keep learning no matter what hurdles are out there.

Understanding the history and context of the Aotearoa New Zealand educational system and of attitudes to neurodiversity has assisted me to understand why I was able to fly under the radar while having learning challenges. I believe I was able to be successful in my academic endeavours due to valued relationships with supportive and inclusive teachers/mentors and coaches throughout my life. I have managed to find support among those who have had to teach me – no one, not even myself, had any idea that I suffered from significant learning challenges. I am 'normal.'

THE BIG DAY – THE NEURODIVERSITY SYMPOSIUM

Attending and Presenting

I started my day by going for a run. In my mind, as I was getting ready to leave home, I thought about my presentation and what I was going to say. Being neurodivergent was an enormous challenge for me, and I felt highly vulnerable.

Once I arrived at work a colleague offered to look over my presentation because of my reactions to reading it over the last week or so. I'd been very tearful and sometimes sobbing. I needed to get that under control. I found out that the second time I read it on the practice days was always better than the first, so at 7:44 a.m. on Thursday I presented to one person. It went without a hitch – and what I mean by that is I did not cry. Having a peer work with me through this was very valuable. In studies of peer collaboration, students have found that they can learn to value and perceive one another more positively when they know the value of cooperation among peers (Ncube, 2011).

I felt empowered and strong and knew that I had other colleagues and friends supporting me on this day. I knew from my research that the literature showed that with increased knowledge, neurotypical students are more

likely to understand their neurodiverse peers and support them for being who they are (Rentenbach et al., 2017). This made me feel very proud that the community of peers I have gathered around me respect me as a lecturer and are with me on my journey of discovery.

Other duties

One of my other duties on the day was to meet and greet our keynote speakers, Jolene Stockman and her husband Mike Styles, outside so we could all walk in together. The keynote speakers were both incredibly talented and courageous individuals. Jolene has presented fantastic team talks in her career, expanding on and talking about her autism. Mike is renowned for his research on dyslexia and is currently working on a book which is close to publication. The title is *Congratulations – You Have Dyslexia: Great Minds Think Differently*. Exploring the link between dyslexia and Irlen's is proving to be a success story.

I was the third speaker on the run sheet for the day. We had a group talk about learning and different teaching aids from the learning and teaching team. Then we heard another neurodiverse practitioner, and the lecturer gave a speech. Then it was me. The anxiety was horrific, frankly, but I got up there and started talking. Coming to that dreaded third line, "This is the first time I have spoken publicly about my diagnosis and my Master's," I felt myself tear up and pull myself together, but as I spoke, I felt empowered. I had done my homework. I had done my research. I was ready!

Communities of practice

Otago Polytechnic is establishing a participatory community of learners and educators interested in understanding neurodiverse experiences and how to maximise educational success for all. According to Lave and Wenger (1991), a community of practice (CoP) is a group of people with a common interest or concern who meet their individual and group goals. Communities of practice exist both formally and informally in some organisations. There is a great deal of interest within organisations in encouraging, supporting and sponsoring communities of practice to gain new knowledge that could in turn lead to higher productivity.

Communities of practice consist of individuals who share a concern or a passion for what they do and learn how to do it better through regular interaction (Lave & Wenger, 1991). We know that best practice for neurodiverse people is best practice for everyone (Lave & Wenger, 1991). Therefore, the goal is to improve awareness and best practice by, with and for neurodiverse learners/tauira, educators and staff in both formal and informal ways.

THE FUTURE

What a fantastic day. The community of practice with and for Neurodiversity is going to be incredible. We all know that people blossom when we collaborate and bring our ideas together, and this is precisely what this community of practice is going to do. It has not only empowered me, but my worldview is also changing. I don't feel as vulnerable as I did. I am not as tearful as I was. This experience has made me feel empowered. I was driven to make a difference. I noted that all neurodiverse people are very different. We can all be diagnosed with similar learning disabilities; we all have some common threads; we can find reading, spelling and grammar challenging, and some like reading slowly or trying not to read at all. In contrast, I speed-read now or skim to get the idea of what I'm reading, but everyone is unique, and diverse. We are colourful in our diagnoses.

I was determined to make this work for me. I have struggled with feeling out of place, and now my eyes are wide open. The feeling of being misunderstood for a long time is slowly slipping away. I can be myself, embrace what I am learning, and take on the challenge headfirst. And I will proudly be called Neurodivergent.

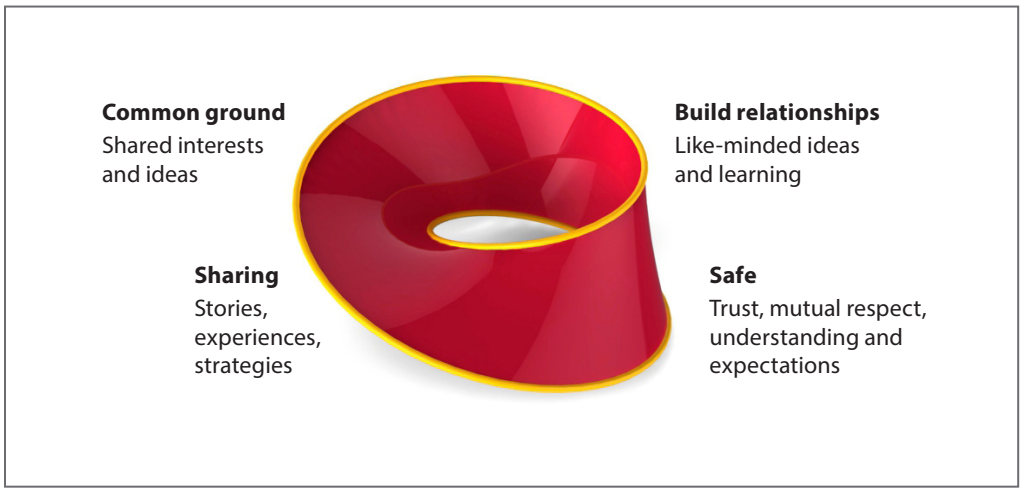

Figure 1. Building my community (Rachel van Gorp, 2022).

CONCLUSION

I believe the Neurodiversity Symposium was a success as it highlighted the diversity of staff and learners with neurodiversity. Some exciting ideas surfaced, such as that learners with neurodiversity learn better if they have someone available for them, who understands how they feel and is willing to adapt their teaching style to support them to succeed. With the community of practice emerging and the associated networking, this event highlights the strengths that neurodiverse students and staff bring to the community. Otago Polytechnic will grow more vital in supporting our learners to be successful through recognising the capabilities that neurodiverse learners can obtain in the classroom and how we, as lecturers, can use these abilities to improve our teaching.

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