Whakapuaki kā Rakahau:
2015 research highlights

OTAGO
POLYTECHNIC
Te Kura Matatini ki Otago

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INTRODUCTION

In previous editions of *Whakapuaka kā Rakahau* I have spoken of Otago Polytechnic's desire to grow research that has impact for our communities and is responsive to their needs and development. In 2015 we developed a system to measure and record knowledge transfer that has been the result of community relationships and our own commitment to applied research. We are the first Polytechnic in Aotearoa New Zealand to develop such a tool and we expect this to ensure we focus our research to stay relevant to our communities in the future. I am very pleased therefore to present our 2015 research highlights which illustrate our ongoing commitment to research with impact.

Finding solutions to technological problems were the motivation for the following projects: David Rozado considers the human computer interface; Christopher Frantz looked at modelling to better understand economic institutional rules and David Finnie analysed risk allocation in the construction industry. In the business arena we had researchers looking at two areas of tourism, Tobias Danielmeier considered the emerging area of food tourism and Rachel Byars investigated the accommodation preferences of Chinese visitors.

In the health and well-being area we showcase work by Anna Askerud on nurse case management, Jean Patterson and Rae Hickey's assessment of the risks of advanced maternal age in the New Zealand maternity setting and Glenda Dixon's change strategy for preventing family violence. Meanwhile, elite youth sportspeople are supported by new feedback initiatives conceived by Simon Middlemas.

Fine art and design research are cornerstones of Otago Polytechnic's research expertise and 2015 saw significant work in these areas including a presentation of the unique Dunedin fashion identity curated by Margo Barton, Jane Malthus and others; and the stories of nurses serving in WWI were portrayed by designers Caro McCaw, Glen Leyton and others for the Otago Museum. Peter Stupples stimulated a multidisciplinary response by working with scientists and artists to curate the acclaimed Art and Light Symposium and exhibition; while Leoni Schmidt provided a new perspective on local firm, Architecture van Brandenburg, and its approach to work.

Finally, Otago Polytechnic continued its commitment to pedagogical research into teaching and its effectiveness for learners via a major organisation-wide initiative entitled Designing for Learner Success (D4LS). This has been researched for its own effectiveness at improving student success by Sally Pairman, Doris Lancaster, Heather Day and Richard Nyhof. Other projects in this area include student motivations in online learning by Dilani Gedera; an investigation of the assessment of achievement in computer programming education by Dale Parsons, Krissi Wood and Patricia Haden; and the effectiveness of intensive short courses to teach entrepreneurial skills by Eva Gluyas.

Alistair Regan

The eyes have it

The eyes may be our windows to the world – but could they one day be able to move exoskeletons simply by thought? David Rozado predicts that this will soon be the case.

He believes that by coupling eye pupil size together with Brain Computer Inferface (BCI) technology, our eyes will be able to control exoskeletons - robotic devices that fit around limbs. BCI systems are capable of establishing a direct connection between the human brain using electrical impulses and electronic or mechanical devices. However, electrical impulses or 'mental switches' are not as accurate as physical or mechanical switches like in a computer mouse.

BCI technology could have a huge impact on individuals who cannot make, or have difficulty making, voluntary muscle movements, or those who cannot use mechanical switches. This includes patients with advanced stages of motor neuron disease and those suffering from specific types of brain stem strokes that lead to locked-in syndrome.

"These patients are in desperate need of innovative ways to communicate with electronic devices," David explains, "and if their sensory and cognitive functions are not impaired then there is a window of opportunity to use a mental switch to do that."

Electroencephalograms or EEG-based BCIs are expensive and often described as "bulky, invasive and inconvenient" for the user. They have limited practical application as they can only be operated under constrained conditions such as laboratory environments with controlled lighting and constrained muscle activity. Additionally, they involve a high number of electrodes being attached to the scalp of the user and the user has to undergo long training sessions, ultimately with a disappointingly low accuracy rate.

"If a person asks a BCI to perform a task a hundred times it will be able to detect the signal 80 times but 20 times it's going to fail to detect it," David says. "An 80 per cent accuracy rate is an issue if we want to use the technology to reliably move our body. We need to move with close to 100 per cent precision."

The idea of using changes in pupil diameter as that mental switch came to David when he was working on eye tracking software technology to monitor eyes. He was looking to discover a way to improve the reliability of EEG-based BCIs.

He had read about a recent experiment that found engaging in high levels of cognitive load such as mental arithmetic or working memory increased a human's pupil size. He monitored the pupil size of

CSP Pattern 1   CSP Pattern 2   CSP Pattern 3

CSP Pattern 6   CSP Pattern 5   CSP Pattern 4
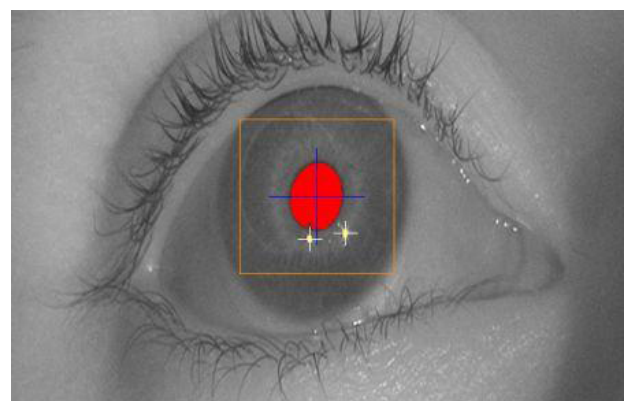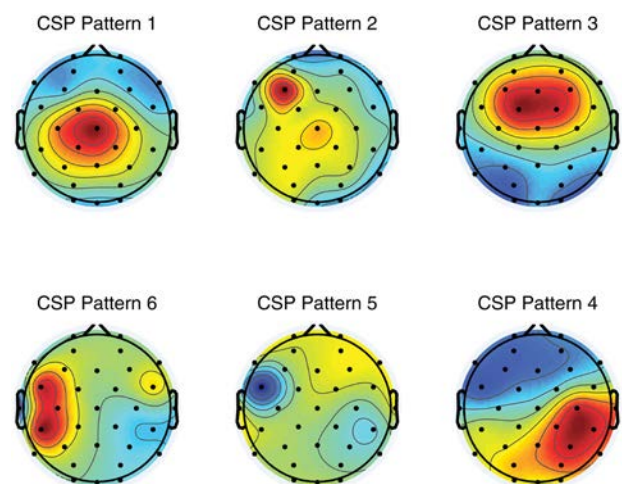
subjects as they imagined they were moving their left arms from a rest position to see if an increase in their pupil size could improve the accuracy of BCI technology.

David's innovation has been proven to increase accuracy rates by 10 percentage points.

"That increase represents a viable approach for the creation of more robust and reliable BCIs and holds considerable promise for further research," he says.

He hopes that further research will find a way to compensate for ambient light effects on pupil monitoring. "The pupil diameter does not only react to cognitive processes, it is also sensitive to changes in ambient light and stimulus brightness," he explains. "If the light changed a lot when we were doing the sessions we found it didn't work, so we had to control for ambient illumination during the experiment and keep it fixed."

David believes this technology will not be available for a while yet, but it is coming. "It won't be next week or next month, but I think we are at the stage where in 10 or 20 years from now, BCI technology will become a reality and it will be used to control exoskeletons and move limbs."

He says eye tracking software highlights how fast technology can change. Until recently, this technology was very sensitive and cost a lot of money. Nowadays, eye tracking software is readily available, and anyone can control a computer using it.

David is continuing his research into assisted technology, which he hopes to make available to everyone. He admits that assisted technologies tend to be very expensive. This is because the numbers of people using them are very low and companies catering to them cannot reach economies of scale.

However, David has a solution. "What I want to do at Otago Polytechnic is to create low cost accessibility software, using final year students' projects to design the software," he says. "Then I want to create a web hub where anyone can access such software accessibility solutions, and use them free of charge."

Rozado, D., Duenser, A., Howell, B. (2015) Improving the Performance of an EEG-Based Motor Imagery Brain Computer Interface Using Task Evoked Changes in Pupil Diameter. PloS one 10.3., March 27 2015.

Helping computers think like humans

How can computers model human behaviour accurately? According to Christopher Frantz, a lecturer within the College of Enterprise and Development, software can be programmed easily to deal with black and white rules but is not well versed in navigating grey areas. These grey areas may include behavioural norms that vary between cultures.

Typically software programmes have relied on modellers' intuition, additional rules or randomisation techniques to help fill in these grey areas or information gaps, however these may not produce accurate results, let alone realistic behaviour.

Christopher explains it like this: "Let's assume you have two rules. Rule number one is that you have to be at work at 8am. Rule number two is that you shouldn't run over pedestrians. Now let's assume that you are running late for work and a pedestrian runs out in front of you. Do you slow down to avoid hitting the pedestrian or do you hit the pedestrian so you can save time and not be late for work? The choice is logical for humans as we know that being late to work is preferable to killing someone. However, computers have no road map for how to handle this type of situation, but need to be able to deal with this in an *ad hoc* fashion."

The introduction of fuzzy reasoning is an alternative mechanism which allows software to integrate numerous opinions. This helps represent human behaviour more accurately and improve communication between computers or robots and humans.

Previous research has focused on having software learn different conceptions of obligations, for example in electronics such as temperature regulation automation. However, Christopher's research is a unique application which uses fuzzy modelling to examine underlying social norms and behaviour which opens up a raft of interdisciplinary uses including social sciences, international business, policy-making and tourism.

One example of this involved studying how people perceived the strength of different command language, eg *should* versus *must* versus *forbidden*. Christopher observed that by using different words he could elicit a different level of inhibiting or prescribing behaviour.

Another application considered the effect of the same word said by people of differing levels of authority. How does a command given by the Chief Executive of an organisation compare with an instruction from a colleague at the same time? The directive subjects followed depended which opinion they perceived to be more relevant or important, an effect possibly linked to authority levels. Such insights can be fed into artificial society models to allow differentiated, human-like behaviours to be represented by computers.

As Christopher concludes: "Getting rid of hard – or crisp – sets allows computers to make prioritisation easier, for example for the interpretation of language in technologies such as Google Voice. However, even outside the computational domain we can learn something about cross-cultural communication; that is, which words we can use to communicate ideas in order to generate a desired effect, whilst maintaining the integrity of an individual."

Frantz, C., Purvis, M. K., Purvis, M. A., Nowostawski, M., Lewis, N. D. (2015) Fuzzy Modelling of Economic Institutional Rules in Alireza Sadeghian, Hooman Tahayori (Eds.): Frontiers of Higher Order Fuzzy Sets, Springer, 2015, pp.87-129.

Buildability risk in construction contracts

Inspired by his former lecturer and supervisor at Massey University – a world-leading authority on construction law – David Finnie chose to investigate the precise interpretation of construction contracts as they related to buildability risk.

"Buildability has been linked to productivity and quality, providing better value for money and often superior quality," says David Finnie, Lecturer within the School of Architecture, Building and Engineering.

"Yet it is possible to design something which complies with, say the Building Code, but which is impracticable or even impossible to build. Therefore, it is important to understand who bears the risk of design buildability."

In order to answer this question, David needed to understand the implied legal terms that exist through statutes, case law or custom which apply in contracts. Although most standard construction contracts address some aspects of buildability, there remain gaps where contracts are silent and so too is legislation.

"This leaves contract users and even those practising dispute resolution to effectively negotiate buildability issues without any clear framework, hence creating inefficiencies and inconsistencies," he says.

David examined how legal principles such as absolute liability, frustration and restitution based on unjust enrichment, impact on buildability risk, and how the processes of adjudication, arbitration or litigation can be used in the cases of disputes.

"When you're legally trained and understand case law you read a contract in a very different light," says Finnie. "Nothing explicitly says the risk of buildability is on the contractor even though this is so."

According to David, when a contractor prices a contract they also need to factor in costs for the likelihood of risk occurring and the likelihood of arbitration decisions.

David learnt this the hard way, through working on an industry project which encountered some complications. "At the time we didn't know what the law was so we had to feel our way through."

Using case law precedent and expert commentary, Finnie has since developed a conceptual framework which establishes how buildability obligations are allocated across the contracting parties dependent on a range of variables. This conceptual framework can guide contract users in interpreting construction contracts and inform contract drafters and policymakers on their rights and responsibilities.

"My hope is that this will help contractors price risk more accurately and write contracts using clear, plain English. This will ensure more transparency and less vagueness."

David's research is already capturing lots of interest. He presented a peer reviewed conference paper to the Pacific Association of Quantity Surveyors Congress held in May 2016 on dispute resolution processes. Another journal article about the implied legal position of buildability has also been accepted, and David has won a scholarship to further develop his ideas into a PhD.

Finnie, D. (2015) Key aspects affecting buildability risk allocation in construction contracts. Masters dissertation, Massey University.

Visualising athletic success using video feedback

What happens when you combine sports psychology and performance analysis? Simon Middlemas, Principal Lecturer and Research Coordinator at Otago Polytechnic's Institute of Sport and Adventure, decided to find out by studying the use of video feedback as a tool for developing elite youth footballers.

Whilst video is increasingly recognised and utilised within elite sport settings as an appropriate medium for delivering information about performance, the effect of video feedback on the psychology of players and coaches has seen little research attention. Previous sports psychology research has highlighted the usefulness of visualisation for building confidence, but has not concerned itself with pre- and post-game video analysis.

Simon's research - conducted with Dr Chris Harwood at Loughborough University in the United Kingdom - had two main objectives: firstly to develop an understanding of the perspectives of both coaches and players on the video-based feedback process within youth football; and secondly to explore how the learning environment, style of video feedback delivery and individual differences affected key psychological outcomes such as confidence, thought processes, motivation and mood.

Although a broad range of common themes were identified, Simon's findings clearly highlighted differences in the way coaches and players perceived the purpose of the video feedback delivery process. The traditional video-based performance analysis feedback model is one where the coach holds the power. They control what footage the athlete watches and often the focus is on replaying mistakes. Although negative reinforcement is beneficial for learning, in the long-term this deficit model can cause athletes to view video feedback as a punishment tool rather than one for learning and development.

"The emphasis of video feedback needs to be on the athlete rather than the coach," says Simon. "The process should focus on the empowerment of the player and not a top-down approach. Players need to be engaged and feel ownership of the learning process otherwise they will switch off and won't get the benefits that video feedback can provide."

What sports psychology shows us is that athletes need to focus greater attention on the best model of themselves performing – a form of observational learning called positive self-modelling – with coaches encouraging the use of video feedback of players performing at their peak.

"Performance analysis is a big area but little time is spent on the psychology behind it. Without understanding the psychology of motivation, performance analysis is irrelevant and hours of analysis are wasted. My research provides a way to link different professionals to work together with athletes and coaches to achieve the same goal."

Overall, Simon's findings reveal the central importance of psychological factors in influencing the effectiveness of video-based practice in youth football. Simon, and colleague Hayden Croft, have now begun to extend and apply these findings to other team sports within New Zealand such as rugby union and netball. This research suggests that the skill and expertise of a psychology professional may add significant value to video-based practice alongside the coach and performance analysis practitioner.

Middlemas, S.G. & Harwood, C. (2015) Perceptions of Video feedback amongst elite youth football coaches and Players. International Sports Science + Sports Medicine Conference 2015 Newcastle Upon Tyne 8–10th September 2015 Abstracts. British Journal of Sports Medicine, October 2015, Volume 49, Suppl 2.

Domestic violence narratives

"A big part of what we do is to work with the language used around domestic violence," says Dr Glenda Dixon, Senior Lecturer in the School of Social Services.

Glenda's work as a clinical leader working with domestic violence in Nelson, New Zealand, and as manager of a domestic violence programme service in Perth, Western Australia, prompted her to devise a new practice framework. Based around the Invitational Model, it invites men into responsibility and accountability.

Traditionally, men's behaviour-change groups have offered a structured psychological curriculum with topics designed to educate and produce a change in the way men act. The group format challenges and confronts participants who minimise and justify their behaviour. However, facilitators can inadvertently reproduce power relations and practices that replicate the context for abuse within the group. Men often feel shamed and therefore disengage.

In response to this, Glenda and Rob Andrew (Senior Lecturer in Occupational Therapy at RAWA, Perth), co-wrote a new practice framework. One of the tools in that framework is a diagram called The Mat. They made the diagram into a large mat, which they place on the floor in the centre of the group. "This provides the men with a visible and accessible language – a new territory in which to stand. 'Preferred ways' in the face of a long history of 'prescribed ways'," Glenda explains. "We lead each man around the diagram and get them to recount and deconstruct the abusive event through language and conversation."

In trialling this new practice tool, Glenda observed the other men in the group actively listened as each man told their story. "We'd ask each man to tell us what he had been thinking at the time he committed the abusive act. What his partner might have been thinking, what she saw, who else was watching, was his son or daughter there and what did they see or hear?"

Glenda has found The Mat to be an incredibly powerful practice tool. It invites the man to move from the general 'we were arguing' response to the specifics of his actions and intentions. She believes this approach "introduces action and choice and is political as it deconstructs the attitudes that support men in privileging themselves over women and children."

The Mat helps to develop a political understanding of the nature of abuse. Rather than focus on what is causing the abusive behaviour, the men are encouraged to think about what is stopping them from acting in 'preferred ways'.

"Many men oversubscribe to dominant discourses of masculinity," Glenda says. "We call this The Prescription and it is enforced by 'dangerous ideas' of self-centeredness, exaggerated entitlement and abdication of responsibility."

Abusive behaviour becomes understood as misguided complicity with dominant cultural interests. The Mat provides the men with a means and a language to move from an 'ethic of control' to an 'ethic of care.'

Dixon, G.L., Andrew, R (2015) From prescribed ways to preferred ways. A language of change for men who perpetrate abuse. European Conference on Domestic Violence, Belfast, Northern Ireland. 6-9 September 2015.

Nurse case management enhances outcomes

Anna Askerud, a School of Nursing lecturer chose to explore patients' experiences of nurse case management in primary care. In doing so, she helped set up a nurse-led, long-term conditions programme based around care co-ordination at Mornington Health Centre, a large primary health care organisation in Dunedin.

The meta-synthesis focused on patients with multiple chronic conditions who had poor health outcomes and were high users of primary and secondary care, as well as social services.

A thematic analysis of data revealed three key themes. Firstly, patients with experience of nurse case management valued the focus on their health and social needs, as well as the long-term relationship and collaborative care that this model provided. Secondly, patients perceived their experiences of nurse case management more favourably than those with General Practitioner

(GP) or district nurse care. Unfortunately, there was also the potential for dependence on the nurse case manager. This could result in burnout and professional boundary issues for the health practitioner involved unless support and guidance was provided.

These results support findings from research in the United States and United Kingdom that point to economic and psychological advantages of proactive and effective care coordination. Research also highlights the benefits of ongoing relationships between patients with chronic conditions and health professionals.

As Anna says, "Nurse case managers, who work as part of a supportive multidisciplinary primary care team, can provide highly valued and effective care which can result in an improved quality of life, fewer hospital visits and better health outcomes for those with long-term conditions."

Askerud, A.M. (2015) Patients' experiences of nurse case management in primary care: a metasynthesis. Master of Health Sciences Nursing (clinical), University of Otago.

Managing risks of stillbirth

The association between maternal age and stillbirth increases beyond age 40. So how do we best care for these women? Otago Polytechnic graduate midwife, Morgan Weathington, and lecturers Jean Patterson and Rae Hickey sought to investigate.

"I observed a trend in my midwifery practice that women were delaying childbirth until later in life," says Morgan. "I often work with women over the age of 40, most of whom are in good health and physical fitness. These women ask me about the risks of childbearing at their age and I realised I needed more knowledge to facilitate these discussions."

Currently there is no New Zealand-based research on the risk of advanced maternal age and stillbirth. As it is a rare occurrence, affecting a small group of women, New Zealand does not have a population large enough to easily draw conclusions from. Therefore District Health Board guidelines on how to care for advanced maternal age women are based on research from countries with different models of care, which do not include mitigating factors such as parity and good health.

"What I found out was that the current District Health Board guidelines recommend induction of labour after 39 weeks to address this increased risk of stillbirth, regardless of complications. However, many New Zealand midwives address this risk differently by using expectant management," says Morgan.

Despite this disparity, stillbirth rates are not vastly different between midwifery-led care and GP or obstetric care. This prompted Morgan to consider the possibilities of a collaborative approach with obstetric colleagues, to hopefully uncover an effective model of care that addresses the increased risk but that also allows individualised care.

This paper is currently under review by the New Zealand Midwifery Journal.

Weathington, M., Patterson, J. & Hickey, R. (2015) What are the risks of advanced maternal age in the New Zealand maternity setting? A literature review of the evidence to inform midwifery practice. 7th Biennial Joan Donley Midwifery Research Forum, Napier, 24–25 September 2015.

When a marae is not your place to stand

What does someone's choice about where to be buried say about them, the marae and Māoridom?

For Richard Kerr-Bell, Kai Whakatere, the close succession of two tangi with two Māori men who did not want to rest at their own marae, prompted a lot of reflection.

"There seems to be a generation – my father's generation – who were told by elders, 'Leave here, find a pākehā woman, she will make things good for you,'" says Richard. "That generation, due to socio-economic and geographic changes became distant to the marae. Although they might return periodically, they lost the feeling of being part of the marae, missed that connecting time, and so by the time of their death, the marae wasn't their strongest connection; other connections were stronger."

According to Richard, one of the factors that may have caused this disconnect was the experience of racism. These men, having their identity challenged and being on their own, battled prejudice from their first day in the new world.

"What this research helps us acknowledge is that the consequences of colonisation still reverberate in terms of identity. This is another reflection of this and it prompts us as Māori to ask questions about how our marae can make it easier for people to stay connected once they move away," he says.

"This tension will always exist. However ultimately whakapapa is bigger than marae; marae fitting into whakapapa. As the Māori proverb says, 'You can never be lost: You are a seed planted in the sacred homeland of the spirit.'"

Kerr-Bell, R. (2015) Ko tōku marae tōku turangawaewae – except when it isn't. Scope, Contemporary Research Topics, Kaupapa Kai Tahu: 3, 55-60.

Improving education through Activity Theory

A lifelong love of learning and a fascination with educational technologies inspired Dr Dilani Gedera to embark on her contribution to the book *Activity Theory in Education: Research and Practice (2016)*. It's a collection of case studies discussing how Activity Theory frameworks are used in a range of contemporary learning contexts. Dilani co-edited and contributed a chapter to the book.

"It was when I was working on my PhD that I tried to find a theory that would help me to identify the contradictions and factors affecting a student's engagement in online learning environments," Dilani explains. "I checked a few, but Activity Theory was the framework I needed because it's all about activities that can help to define, understand and analyse human practices, such as learning processes."

However, Dilani could only find a few studies that used Activity Theory in education. So, once she completed her PhD, she decided to find case studies by different scholars from several continents and put them together in a book to help people to see how Activity Theory can be used theoretically and practically in education.

So, what exactly is Activity Theory, and what difference can it make in contemporary learning environments?

Activity Theory is comprised of elements which together form activity systems. The elements of an activity system include: Tools, Subject, Rules, Community, Division of Labour, Object and Outcome. Through the Activity Theory framework, practitioners are able to identify now these elements work together and also contradictions within and between activity systems.

"I think tertiary institutions need to improve their processes continuously, and that's why we need to have ways to improve our practices," Dilani says. "Activity Theory provides us with a lens through which we can identify contradictions and identify how things are working in a particular context. I think using Activity Theory in this way will make a difference."

Activity Theory in Education: Research and Practice (2015) is comprised of four sections. The first section of the book focuses on empirical research on using Activity Theory in analysing students' and teachers' experiences of learning and teaching in face-to-face and online learning contexts. Section II contains insights in identifying historical and systemic tensions in educational contexts using Activity Theory. The third section discusses conceptual and contextual aspects of educational contexts through Activity Theory. Section IV considers the application of Activity Theory in understanding teachers' Pedagogical Content Knowledge and curriculum development.

Dilani's chapter illustrates the three generations of Activity Theory, and demonstrates how its elements have been used in identifying contradictions in a university blended learning course. She also explains that "integrating the Activity Theory framework in an educational context requires some alterations to the terminology," and proposes and presents new terminology to suit educational environments.

Dilani found the most exciting part of her research was observing a particular contemporary learning environment. This allowed her to identify what was working and what was not, and to improve practices.

She believes that, due to its nature, online learning can lead to disengagement. This can create an "anonymous sort of teaching", and miscommunication can easily take place.

"When I was working on my PhD, I observed different case studies and I identified why that can happen," Dilani explains. One of the main contradictions she discovered was how many courses are not designed in a "student-friendly" manner. This creates a barrier in terms of engaging students.

Dilani looked at one particular classroom at the University of Waikato, which she refers to in her chapter. "I discovered the students were frustrated because they wanted specific feedback but weren't getting it," she says. "They wanted to talk more, communicate more, and they couldn't do that either. They wanted feedback on how they were doing and how they could improve. If they got a C on an assignment they wanted the lecturer to tell them how to get an A, but the lecturer gave different feedback. He didn't give them what they wanted."

She also paid attention to what the students did enjoy, and what was working in the classroom during face-to-face interactions. However, as it was a blended learning programme, the online component did not allow students to take an active role.

"I found a disconnection between the virtual part of the course and the face-to-face part. They weren't linked, so it was like the students were doing two different courses. I would say that no matter where you are in the world, if you want to make a blended programme successful then you have to link both parts.

"Sometimes we think that things are going well, but if we look at a particular context from a student's perspective, what they want can be quite different," Dilani explains. "The way students think can be different, their perspectives are often different and what they need is different. Sometimes the lecturers don't acknowledge that and, of course, it can also happen the other way around."

To improve the situation, Dilani believes lecturers and students need to "be on the same page". They need to identify what the issues are and then take steps to resolve them.

Dilani found improving the design of the learning process can make a significant difference.

"Course design is huge when it comes to online learning," Dilani says. "I'm thrilled that Otago Polytechnic has embraced the concept and is doing a massive project called Designing for Learner Success, which ties in very well with that. We are redesigning and redeveloping all our courses to make them more learner-centred. This project promises lots of feedback for students to help them improve and succeed."

Dilani also believes we need to improve how we teach students. "It's not lectures anymore – that's so old school. Learning has to be activity-focused, so if it's a hands-on, experiential type of learning, students learn better."

Professor Yrjö Engeström wrote the foreword to Activity Theory in Education: Research and Practice. Based at the Centre for Research on Activity, Development and Learning (CRADLE), at the University of Helsinki, he is arguably the world's leading proponent and academic on the subject.

"In spite of the widespread and rapidly increasing use of Activity Theory in educational research, few collections of this work are available. Activity Theory in Education: Research and Practice is such a much needed collection of practical experiences, theoretical insights and empirical research findings on the use of Activity Theory in educational settings."

Dilani plans to continue to use Activity Theory in her future research projects. "It's a great framework to find out what we are doing, how we are doing, and how to improve our practices."

She enjoys designing and developing e-learning resources and activities, as well as providing educational technology support to staff as an e-learning designer at Otago Polytechnic. Prior to this, Dilani has worked as a lecturer in Malaysia, Sri-Lanka and New Zealand for 12 years, where she actively integrated educational technologies into the courses she taught. Her passion for learning and interest in educational technologies has led to several research projects in the past years in which she has explored how these can enhance learner experiences and engagement. Dilani holds a PhD in Education (E-learning) from the University of Waikato. Her research interests and areas of expertise include: E-learning, Educational Technologies, Technological Pedagogical Content Knowledge (TPCK), Learner Engagement, and Activity Theory.

Gedera, D. S. P. & Williams, P. J. (Eds). (2016) Activity Theory in Education: Research and practice. Sense Publishers, Rotterdam: The Netherlands.

Designing for Learner Success

When Otago Polytechnic's educational performance indicators reached a plateau of between 82 and 84 per cent overall, the Leadership Team sought innovative solutions to break through this level. In response, it launched a strategic initiative to improve educational performance for the remaining 16 to 18 per cent of learners and also embed Otago Polytechnic's curriculum priorities into all curricula.

Designing for Learner Success is the outcome; an organisation-wide initiative that aims to improve overall success and satisfaction rates for our learners, better integrate development of learner capability within programmes and make programme delivery more sustainable long-term. Headed by Professor Sally Pairman, the initial team of Carolyn Levy, Richard Nyhof, Doris Lancaster and Heather Day commenced this three to four year initiative in 2015 providing centralised leadership, support and resourcing to implement our Learning and Teaching Strategic Framework.

Leveraging the opportunity provided by NZQA's Targeted Review of Qualifications (TroQ) that requires the development of new programmes of study to meet the graduate profiles of New Zealand qualifications, Otago Polytechnic is progressively redesigning, developing, implementing and evaluating certificates, diplomas and degrees. The initiative also embeds Otago Polytechnic curriculum priorities, including a blended delivery model, into programme redesign for each qualification.

As well as aspiring to boost educational performance, learner capability development, blended delivery and experiential learning, the initiative also aims to provide benefits to the Polytechnic in terms of relieving organisational financial pressures, and workload stress for academic staff.

Although similar projects have been undertaken by other institutions, the scale of this curriculum design process at Otago Polytechnic is much larger than anything seen previously.

Key aspects of difference include the use of blueprints and integration workshops. Blueprints are maps of individual courses within a qualification that seek to explain and define how a student moves along a study pathway. These blueprints take into account pedagogical considerations and aim to marry up individual courses with desired graduate outcomes. Integration workshops are an extension of this process involving lecturers from several different courses within the same qualification meeting up and talking through their blueprints in order to get a holistic overview of the qualification as a whole, ensuring all the blueprints work together.

As the latest government Tertiary Education Strategy says, "obtaining and developing transferrable skills is one of the most crucial aspects of tertiary study." Designing for Learner Success will help Otago Polytechnic excel in this area by ensuring these capabilities are developed through learning activities and integrated into assessments.

Professor Sally Pairman, Richard Nyhof, Doris Lancaster and Heather Day between them presented their findings at the third Sino-NZ Technical and Vocational Education and Training Research Forum, and the National Tertiary Learning and Teaching Conference in 2015.

Nyhof, R. (2015) Designing for Learner Success: an institution-wide initiative at Otago Polytechnic. Abstract in Clayton, J. & Liu, G.M. (Eds.). Proceedings of the third Sino-NZ Technical and Vocational Education and Training Research Forum, Hamilton, November 25-26.

Pairman, S., Day, H., Nyhof, R., Lancaster, D., Levy, C. (2015) Designing for Learner Success (D4LS) project at Otago Polytechnic. National Tertiary Learning and Teaching Conference, 30 September – 2 October, Tauranga.

Improving programming skills and pass rates

Computer programming educators currently work in a very stressful context. On the one hand, industries around the world are complaining about a serious shortage of skilled programmers. On the other hand, programming is one of the most difficult academic subjects for students to learn, with some of the highest reported failure rates across tertiary institutions. Naturally, researchers in the area are working very hard to determine how to teach programming more effectively.

A few years ago, Dale Parsons, Krissi Wood and Patricia Haden from Otago Polytechnic's College of Enterprise and Development participated in a large multi-institutional study of programming assessment. This involved computer science educators from several countries submitting their exams and other assessment tools, and a meta-analysis being performed. The results showed that many of the assessments consisted of multiple-choice questions which tested obscure points of computer language syntax and theory. This did not align with what the researchers believe a student needs to know in order to be able to program at a professional level.

"The results of this experiment have directly informed our teaching practice," says Patricia. "We have continued to refine the use of activity diagrams for teaching and assessment in our introductory programming papers. These tools allow us to observe the developing understanding of students long before they are experienced enough to write large working programs, they give us insight into what aspects of programming syntax, semantics or pragmatics a student is struggling with, allowing us to tailor our support for that student most effectively."

The team's research is already proving promising. Student pass rates have risen, and the team has had the great joy of watching most of its students mature into information technology professionals.

Parsons, D., Wood, K. and Haden, P. (2015) What are we doing when we assess programming? 17th Australasian Computing Education Conference, Sydney, Australia. Conferences in Research and Practice in Information Technology, Vol. 160. D. D'Souza and K. Falkner, Eds.

Attracting Chinese visitors

Safety, cleanliness and staff friendliness: According to Rachel Byars, Principal Lecturer in Tourism at Otago Polytechnic's College of Enterprise and Development, this is the winning formula for hoteliers seeking to attract Chinese travellers.

Hotels and accommodation have long been both Rachel's teaching and personal interests. After observing the rapid rise in Chinese visitors to New Zealand over the past two to five years, and inspired by Dunedin's sister city relationship with Shanghai, Rachel set out to discover the factors that influence Chinese visitor selection of accommodation in New Zealand to further inform her teaching practice.

One of the things Rachel was keen to discover was whether there was an increasing move towards more independent self-drive holidays for Chinese visitors. Her results showed that, overwhelmingly, 89 per cent of Chinese visitors came as part of a tour group staying at pre-booked accommodation in chain hotels.

Despite this, signs of change may be on the horizon. Of the tourists surveyed, most said they would be looking to come back to New Zealand again, this time on a more independent holiday.

"As part of my research I also interviewed accommodation operators in Dunedin and Queenstown. My desire is to help local businesses gain an understanding of this specific visitor segment's needs so they can match what they provide to the requirements of their visitors," says Rachel.

"I discovered that having signage or pamphlets in Mandarin or Cantonese would be a huge drawcard for these visitors as would living up to the concept of manaakitanga; a personalised connection approach."

Byars, R. (2015) Factors that influence Chinese visitor selection of accommodation in New Zealand. 13th Asia Pacific Forum for Graduate Students' Research in Tourism Conference in conjunction with 14th Asia Pacfic Forum Conference 10-12 June, Auckland, New Zealand.

Breaking out of silos

Imagine a new opportunity, challenge the status quo, interact and empathise with the customer, prototype, test, evaluate and then reiterate. This is the philosophy of Eva Gluyas, Commercial Strategist and Manager of workSpace, Otago Polytechnic's business solutions enterprise.

Four years ago, Eva and colleagues Steve Silvey, Ruth Appleby and Gavin Clark, had a vision to create six-week intensive entrepreneurial 'boot camps' called SEED (Student Enterprise Experience in Dunedin) for a small group of highly-motivated participants.

Although the boot camps included a taught element, they were not a traditional course, instead relying heavily on self-learning, self-exploration and experiential action. Unlike start-up weekends, the focus was on creating collaborative networking as opposed to a competitive environment using empathy mapping, user-centred design thinking and lean business principles.

"What we noticed over the course of these SEED events was that they really changed the way the individuals thought about problems and opportunities," Eva notes. "Having participants from a variety of disciplines including marketing, commerce, design, IT, medicine, chemistry, law and others enabled great things to happen where the edges of these disciplines met."

The results of the follow-up surveys showed that as a result of the boot camps, perceived entrepreneurial ability and knowledge significantly improved. In addition, the number of participants who indicated they would like to undertake further formal study in entrepreneurship doubled from the time of starting the course.

"This research prepares students for a changing global employment context in which traditional salaried jobs are slowly being phased out and self-reliant income generation will soon become the normal employment situation. What we did was show people how to adapt and make that leap by thinking wider and breaking out of narrow lenses," says Eva.

Cornwall, J., Kirkwood, J., Clark, J., Silvey, S., Appleby, R., Wolkenhauer, M., Panjabi, J., Gluyas, E., Brain, C. & Abbott, M. (2015) Can a short intensive course affect entrepreneurial ability, knowledge and intent, or further entrepreneurial study? An assessment of the SEED programme, Dunedin, New Zealand. Industry and Higher Education, Volume 29, Number 5, October 2015, pp. 397-404(8).

Enhancing wine with architecture

Does architecture influence the perception of the value of food and wine experiences? Academic Leader for Interior Design, Tobias Danielmeier would argue that it does.

What marketing research shows us is that consumers and tourists alike are seeking "personalised sensory and bodily-place experiences." Due to changing wealth distribution, education, individualism, marketing skepticism, and the increasing importance of experience economies, the hospitality industry needs to change how and by which means it represents itself in order to stay viable. Despite this there is a lack of research between culinary experiences and spatial effects – something Tobias is keen to change.

Tobias explains how the role of place and the narration of place will increase in importance as they are used in conveying uniqueness and points of difference. It is argued that experiences and place performances will increasingly take precedence over the mere consumption of wine or food products. Focusing on the wine industry in particular, Tobias examined how architecture enables the enactment and narration of company values by individual wineries and can enhance the perceived value of an experience.

"What we have found is that there is an expectation of customers, as they become more aware, for 'authentic experiences'. Basically the customer wants to feel like they are getting the total package, and architecture can be a vehicle for enabling the customer to feel like an actor or voyeur to a different lifestyle."

One example of this is the Loisium Wine Information Centre in Langenlois, Austria, designed by US architect, Steven Holl. The building displays spatial configuration of the 900-year-old cellar system on its envelope. The visitor experience consists of a walk through the main wine centre, the cellars and the gardens and includes sensory experiences such as touching loess loam, experiencing the reflection of the rays of the sun, wine-related music and smells. The brochure uses slogans such as 'All senses engaged' and 'Become wine'.

"For many tourism and winery operators there's a disconnect between the service or product they are offering, and the desires of the consumer," says Tobias. "What we identified in our research is that there are eight distinct drivers which will shape the future of food and wine tourism including cultural and social capital, luxury tourism, experiences, the balance between technology and the natural environment, globalisation and climate change, and competition among attractions and destinations. Embracing the role of architecture in adding value to food and wine experiences is one way to respond to the pressure of these drivers."

Danielmeier, T., Albrecht, J.N. (2015) Architecture and Future Food and Wine Experiences. Chapter in The Future of Food Tourism - Foodies, Experiences, Exclusivity, Visions and Political Capital (Eds.) Ian Yeoman, Una McMahon- Beattie, Kevin Fields, Julia N. Albrecht, Kevin Meethan. Channel View Publications.

Reflecting nature; Denouncing waste

What does a local architecture firm have to do with challenging a waste crisis 10,000 kilometres away in China? Architecture van Brandenburg, which has studios in Dunedin and Queenstown, has been working on the design for the Marisfrolg Apparel Headquarters in Shenzhen, China. Professor Leoni Schmidt, Head of Otago Polytechnic's Dunedin School of Art, was invited to reflect on Architecture van Brandenburg's cross-disciplinary approach as part of her research into the links between architecture, visual arts and sustainability.

Inspired by Spanish Modernist architect Antoni Gaudi and 'biomimicry' – the process of referencing the natural world to escape from traditional geometric shapes and Eurocentric designs – the firm chose to only use waste materials as cladding for the Headquarters.

"Currently the smooth white surfaces of Marisfrolg Apparel Headquarters are being finished with waste produced in China, a country fast becoming one of the major waste accumulators in the world," says Leoni. "Architecture van Brandenburg's practice brings together the unfurling of beautiful natural forms in space with an ecological system of working…The waste materials add value to their work while also transforming the base materials into a higher aesthetic whole."

As Fred van Brandenburg, the company's Managing Director comments, "Sometimes architecture gets thought of as a science but the way a structure is put together is an art. In architecture gravity is our enemy, but many natural processes defy gravity; for example, how a leaf cantilevers from its stem and its twig for optimum photosynthesis. Leoni really understood this."

Leoni's research, which accompanied Architecture van Brandenburg's exhibition during the 2014 Architecture Biennale in Venice titled *Unfurling* was so successful that the firm was invited to exhibit in San Francisco for four months in 2015. There, the exhibits and Leoni's second article were appreciated by well over 3000 people. There is currently talk of exhibiting in Sydney in late 2016, and other venues in other parts of the world thereafter.

Schmidt, L. (2015) Architecture van Brandenburg in an Era of Waste Crisis. South African Journal of Art History, Vol.30, Number 2, 2015: 139-145.
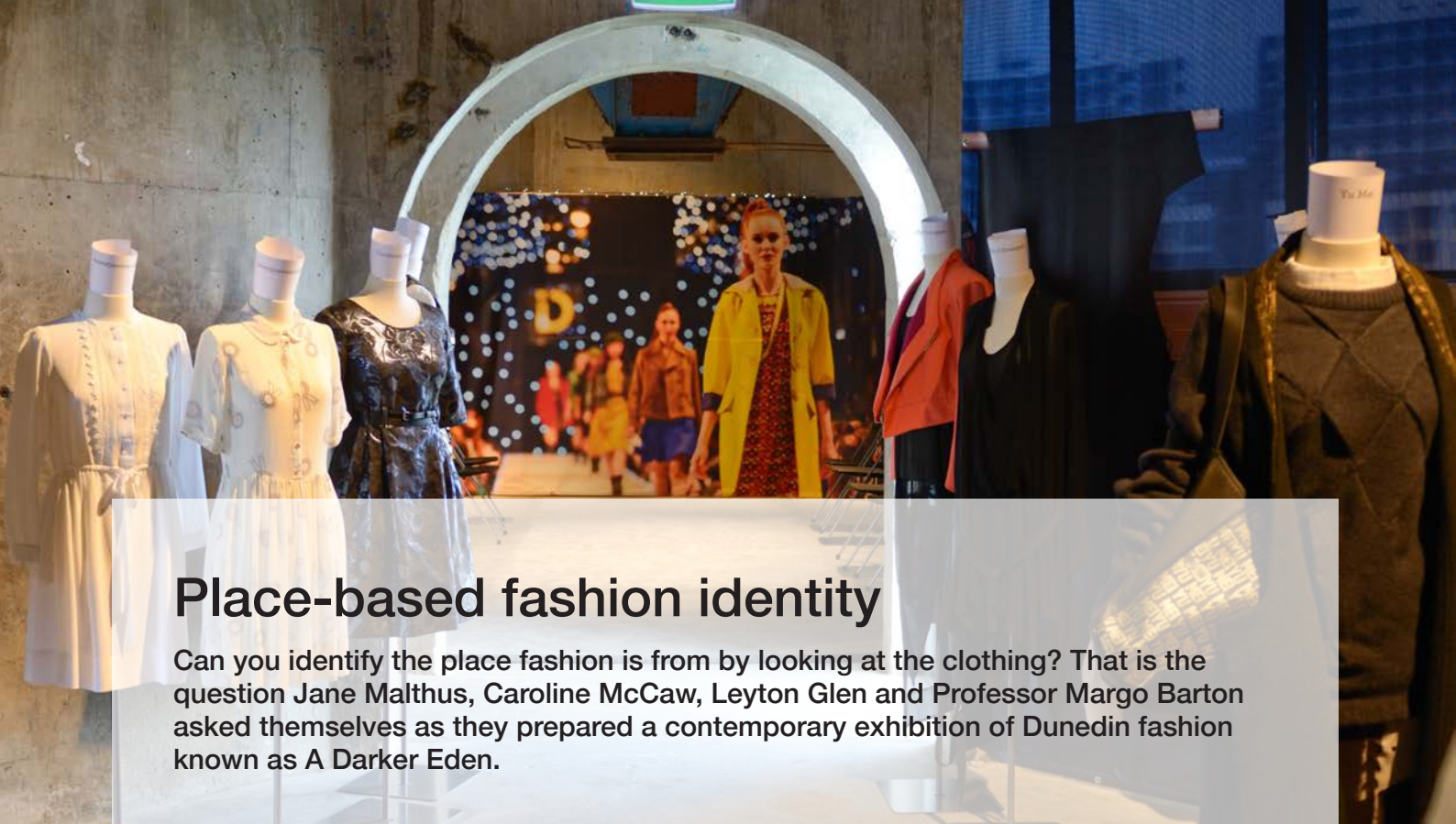
Place-based fashion identity

Can you identify the place fashion is from by looking at the clothing? That is the question Jane Malthus, Caroline McCaw, Leyton Glen and Professor Margo Barton asked themselves as they prepared a contemporary exhibition of Dunedin fashion known as A Darker Eden.

Situated in the non-traditional exhibition space of six former cement silos on Auckland's waterfront, the exhibition showcased the work of prominent Dunedin fashion labels Tanya Carlson, NOM*d and Mild Red. In addition, iD Dunedin Fashion Week collections and Otago Polytechnic student designs were also on display helping explore the concept of place-based fashion identity.

"Some cities are just considered darker than others," explains Jane Malthus. "In the southern hemisphere, Melbourne and Dunedin have that reputation, deserved or not, but both have used it to their advantage. Dunedin's neo-gothic and colonial architecture, four-seasons-in-one-day weather and harbour and hills setting have long attracted writers, artists, musicians and fashion, jewellery and graphic designers to settle here," she says

"However although creativity and non-conformity are part of Dunedin's life force, not all fashion emanating from Dunedin is dark, heavy, wintery or all-encompassing. In reality, designers who do all that also do light, airy, printed and even floaty work, so we wanted to acknowledge that breadth."

The exhibition ran for two weeks, attracting 3000 visitors and was the first time such an extensive scope of Dunedin fashion has been displayed. Constraints of time, distance, space and budget all contributed to make this a very unique exhibition experience for visitors.

The exhibition's design process was analysed in a paper delivered at Interplay: International Association of Societies of Design Research conference in late 2015.

"What we wanted to communicate was that regionally-based identity can impact on design process and outcomes as well as showcasing the city in a new light and I think we were successful in doing that," Jane affirms.

Malthus, J., McCaw C., Leyton, G., Barton M. (2015) Interplay and Inter-place: A collaborative exhibition addressing place-based identity in fashion design. International Association of Design Research Societies, Brisbane, Australia, 2 – 5 November.

Cross-pollination between art and science

Can the science of light be translated into an aesthetic vocabulary? This was the challenge that Peter Stupples, Senior Lecturer in Art History and Theory at the Dunedin School of Art, tasked a team of artists with in celebration of the 2015 UNESCO International Year of Light.

Peter worked with a team of science researchers from the University of Otago, headed by Professor David Hutchinson of the Department of Physics. In conjunction with Dr Ian Griffin from Otago Museum, this nine-month project culminated in an exciting exhibition in August 2015.

"We did not aim to illustrate the science literally – indeed many researchers' science is not something that can be depicted directly as what they study is not visible to human sight," says Peter. "Rather, through collaborating with the scientists, original and often quite unexpected artwork emerged, which enabled the scientists to see their work in a different context. Both artists and researchers were challenged through this process and pushed to understand their disciplines in a new light."

The collaboration involved a group of 16 artists – including painters, printmakers, sculptors, photographers, creators of electronic installations, ceramicists and fashion textile designers – and 11 scientists from a variety of disciplines including botany, physics, anatomy, physiology and computer science. Both groups reported benefits from the process. For the science community it was a unique opportunity to have the work communicated to the public in a novel way, while for the artists it provided a stimulating new focus for their work and many learnt an enormous amount about science in the process.

"We know of no other collaboration of art and science that takes the same shape as this elsewhere in the world so it was truly an exciting venture," says Peter. "Part of the success of this was that we didn't put too many rules or boundaries on what was possible or expected."

The exhibition was the third in a series of annual exhibitions, following on the tails of *Art and Anatomy* in 2013 and *Art and Neuroscience* in 2014. In 2016, a new exhibition will be on display, inspired by the theme of *Art and Space*.

Art and Light Exhibition. Otago Museum, 15 – 30 August.

A journey of care

A desire to engage young people with old stories was the driving force behind a local social history storytelling exhibition: *Who Cared? Otago Nurses in WWI* at Otago Museum.

In 2014, Otago Polytechnic Communication Design Lecturers Caroline McCaw and Leyton Glen teamed up with a group of first and second-year students for an ambitious project with Otago Museum. In 2015, the team expanded to include Morgan Oliver and Jon Wilson and involved a student team that would bring the project to fruition.

Inspired by the literary narrative of the historical novel *Lives We Leave Behind* by Dunedin author Maxine Alterio, staff and students of the School of Design illustrated the contribution of three nurses from Otago caring for wounded soldiers in France during World War One. This interactive exhibition was set during the autumn of 1917. It allowed visitors to immerse themselves in the journeys of the nurses at a temporary surgery, hospital ward, and Nissen hut where the nurses lived and worked.

"What we hoped to bring about was an empathetic experience," says Caroline McCaw. "We hoped that young people could find a part of themselves in the nurses' stories as well as learn about and be inspired by experiences they had never before imagined."

Who Cared? was the biggest public exhibition that School of Design students have ever worked on. It also represented a huge investment of time. Over a course of six months, the completed exhibition attracted over 38,000 visitors spanning a wide range of demographics.

The exhibition took a fully immersive approach to history. "There were no panels of text in the entire exhibition," says Caroline. "All the information was embedded in the characters, their few possessions, and the sounds and smells."

She explains that the exhibition allowed staff to take the teaching experience a lot further. "We wanted to challenge the idea that learning begins and ends in the classroom, and I think we were successful in proving that to students."

At times, she adds, students working on this project were very moved and challenged. "We all learnt a lot about new techniques including interaction design in the museum context, the process of sourcing props and using projectors and screens. We also absorbed a lot of new historical knowledge about ancient surgery techniques, famous battles and the New Zealand contribution to the Great War."

This exhibition has also been an exciting project for Otago Museum, according to its Head of Design, Craig Scott. "Such a collaboration had never been attempted before at the Museum and staff were excited to take the handbrake off and see where the students' creativity would lead," he says. "The subject itself was a hard one to tackle. How could we communicate such a traumatic experience and its emotional legacy?"

Craig feels the exhibition achieved this by steering away from the usual approach of bombarding visitors with interpretive panels alongside authentic artefacts. "It created the opportunity for visitors to engage with the content in a way that was both meaningful and respectful. The results overwhelmingly proved that this approach was effective and resonated with the public."

Photos by James Russell.

McCaw, C., Glen, L., Oliver, M., Wilson, J., and Scott, C. (2015). Who Cared? Otago Museum, Dunedin.

Who Cared?
OTAGO NURSES IN WWI

Free exhibition
26 September 2015–31 January 2016
1877 Gallery, Otago Museum

www.otagomuseum.nz

Based on Dr Maxine Alterio's historical novel
Lives We Leave Behind (Penguin Books NZ, 2012;
Prisma Editions, France, 2013).

OTAGOmuseum

OTAGO POLYTECHNIC
Te Kura Matatini ki Otago

In print

The latest books from Otago Polytechnic researchers

Nice Background

Bolland, M. (2015)

Essays by Bridie Lonie & Emily Goldthorpe

Edited by Lauren Gutsell

Design by Gregory Thomas

Nice Background is a book about image culture, climate change and the changing landscape of Aotearoa me Te Wai Pounamu. It is about how our experiences of this place are mediated through images, and how these landscapes, their histories and our experiences of them are commodified. It seems hard to imagine that nature and commodity culture – the globalised, deregulated 21st century economy – could be more at odds than they are at the moment. Yet beyond the obvious frontlines of this war – which here means coal, cows and cars – a curious paradox exists: commerce now emulates the picturesque, and vice versa.

Forged

Zellmer, J. (2015)

Darling Publications Cologne & New York

ISBN: 978-3-945525-06-7

Forged explores issues of national identity and migration by 'changing' the status of iconic objects. Combining history and photography, Forged shows the changing discipline of jewellery.

Theses and dissertations

Master of Occupational Therapy

Annie Baigent: Spirituality in daily activities of mothers and their young children

Elizabeth Edens: "Choosing to Care" or was it "Hobson's Choice"?

Sally Hollinshead: I Didn't Realise: An Obesity Case Study with an Occupational Perspective

Helen Jeffery: Just Another Approach. New Zealand Occupational Therapists' Use of Adventure Therapy

Frank I-Chien Lu: An Exploratory Study into the Use of Perceive Recall Plan Perform System of Task Analysis in Clinical Practice in New Zealand

Tracy Murphy: Risk in Occupational Therapy Practice

Master of Midwifery

Stefanie Kalmakoff: Predictors and documented reasons for formula supplementation of breastfed babies in a New Zealand 'Baby Friendly' hospital.

Master of Fine Arts

James Doyle: A Tactile Imagination

Timothy Player: Dissensus Consensus: A Case Study of Jacques Rancière's Politics of Aesthetics and its Relation to Performance.

Diana Theron: White Guilt. A Graphic Novel

Master of Visual Arts

Ana Teofilo: Lanu ma Musika (colour and music)

Master of Professional Practice

Simon Morris: Mapping Cornice Formations with Real Time Kinematic (RTK) GPS

Susan Harris: Heathcote Village Project: Community-Led-Development in a Post Natural Disaster Setting

Rodney Eddy: Closing the Loop on Sustainable Development Responsibility for Developing Countries

Paul Allott: Raising the Bar – the impact recent changes in legislation in the areas of health and safety have had on companies

Aaron Halstead: Social Entrepreneurship in the not-for-profit sector

Catherine Kemp: Engagement through Change

Shea McAleese: Central Hockey's High Performance Structure

John Hibbs: Anchors into mindfulness – teaching mindfulness to children

Naell Crosby-Roe: Exploring a behaviour-based model of marketing practice for a tertiary education context

Adrian Woodhouse: Culinary Arts Pedagogy: A Critical Enquiry into its Knowledge, Power and Identity Formation

Master of Design Enterprise:

Emmellee Rose: Demystifying Sustainability: The design and development of a toolkit to generate sustainable business narratives

Kuang Ma: Design for Agricultural Automation – Universal Robot Platform. A Validation of Human-Centred Product Design Process Using Engineering Feasibility and Business Operation Viability Perspective as a Foundation

Want a monthly update?

The Research and Enterprise Directorate at Otago Polytechnic now also produces a monthly e-newsletter, *Relevant Research***, which showcases stories about the many ways that research at Otago Polytechnic makes a difference to our communities – both business organisations and the public.**

If you would like to subscribe to this publication, please email
lesley.brook@op.ac.nz

Acknowledgements

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