Otago Polytechnic and Southern Institute of Technology Collaborative Research Symposium, 2018

Abstracts

Is Bart Simpson offering sage advice to New Zealand farmers?

Andy Ang, Southern Institute of Technology

This study applies asymmetric rather than conventional symmetric analysis to advance theory in understanding job outcomes in New Zealand farming. The study applies systematic case-based analyses to model complex relations among conditions (i.e., configurations of high and low scores for variables) in terms of set memberships of farm owners. The study uses Boolean algebra to identify configurations (i.e., recipes) reflecting complex conditions sufficient for the occurrence of outcomes of interest (e.g., high versus low financial job stress, job strain, and job satisfaction. In a large-scale empirical study of farm owners (n = 928) in four (contextual) segments of the farm industry in New Zealand, this study tests the fit and predictive validities of set membership configurations for simple and complex antecedent conditions that indicate high/low core self-evaluations, job stress, strain, and high/low job satisfaction. The findings provide insights into the attribution concept of reason and cause explanation by high and low job satisfaction farm owners due to the impact of stressors and effect of psychological strain. However, the findings do not support the conclusion that Bart Simpson's advice, “Don't have a cow, man!” implies that having cows associates with high psychological strain and high stress. The findings in the present study do not support the implication of the cows alone associates with high stress. In fact, dairy farming appears much more frequently in farmographic configurations indicating low psychological strain and low stress rather than Simpson's implication. Possibly, similar to pets, cows may be given names (e.g. Betsy) more often than sheep, beef, or horticultural crops.

Analytic, descriptive and prescriptive components of evolving jazz: A new model based on the works of Brad Mehldau

Mark Baynes, Southern Institute of Technology

Jazz has steadily evolved from its inception in the late 19th century to the present. As is the case for other genres, musicological analytic research on jazz evolution has lagged behind its practice; consequently, there is a paucity of in-depth analytic research on the music of recent innovators. Among the most recent examples of this evolution, the works of Brad Mehldau as a solo/ensemble pianist and as a composer arguably embody some of the most compelling innovations in the field. Non-academically oriented jazz writers and fans have consistently assigned these works vanguard status, but Mehldau's output has not yet been sufficiently examined to prescribe performance methods. This presentation contains (1) analysis of improvisation contained within Mehldau's music, and definition of a new analytical lexicon derived from a holistic study of consonance, dissonance and (2) research into perceived motivation in music by cognitivists such as David Huron and Leonard Meyer.

The inherent uncertainty of money: A quantum game approach

Frederico Botafogo, Southern Institute of Technology

The presentation is structured as a mind-boggling teaser that introduces the idea that money is actually the most uncertain asset in our modern financial economy. Background: axiomatic, formal microeconomic theories do not account for the concept of money. This is known as the Hahn problem. Those theories rely instead on the concept of *numéraire*, which express the value of goods and services in relation to a single, arbitrarily chosen standard commodity. This implies that the concept of value is deterministic. However, we live in a world where values (e.g., prices, costs) fluctuate. Usually, this is modelled by assuming that the inherent value of goods and services varies. I am suggesting an alternative model whereby it is the inherent value of money that varies. Method: structured as a purely conceptual discussion, the presentation will first introduce one simple game, the flip-flop game, to explain how value can be framed statistically. Then, it proceeds by introducing the idea that a standard for measuring value is possible which is inherently uncertain. That particular standard will be associated with the concept of money. Objective: the presentation is intended to test the

possibility of conveying to a lay audience a counter-intuitive concept without using mathematics. To do so, reference is made to a simple flip-flop game between two agents. Outline: the Hahn problem; the *numéraire* concept; a flip-flop game without money; a flip-flop game with money; discussion/conclusion. Results: if I can feel any sort of empathy from the audience, I would then proceed to work on a paper aimed at being published somewhere. If not, I'd just drop the idea.

Pilot of the Eyes Right Toolkit in secondary schools

Mary Butler, Otago Polytechnic

There is currently no low vision service funded in New Zealand and a consequent risk that visual impairment goes under-diagnosed. For example, visual impairment may be one of the consequences of a stroke, or may be a factor contributing to a fall. There is an identified need for a tool that therapists can use to screen for visual impairment. The tool needs to be self-explanatory and easy for therapists to use. Ideally, it would screen for different types of visual impairment and suggest possible first response interventions that would help clients to improve their functioning. Such a screening tool was initially developed as part of a PhD at the London Institute of Optometry (Rasa, 2009), and it was further developed by the Pocklington Trust. The copyright for this tool has been given to New Zealand, and this paper describes a pilot study, where it was used in a decile one high school: 122 secondary students were screened, with 21 of them referred to an optometrist. One of the secondary students reported: "It let me know I could see well, and all about the harmful stuff that can happen to my eyes and how I can protect them."

Cultural empathy: A comparison of levels of empathy between 1st year nursing students and 3rd year nursing students.

Cassie Carstensen and Jess Domigan, Southern Institute of Technology

Empathy within nurses appears to be on the decline, this is a startling admission when we know that poor patient outcomes occur when it is perceived that a nurse lacks empathy (Tracey Levett-Jones, 2018). Further to this, there is a correlation between the perceived empathy of a nurse and patient satisfaction. An Australian study cites a lack of empathy as one of the main themes of disciplinary complaints against nurses (Doyle, Hungerford &

Cruickshank, 2014). This begs the question, can we improve how empathy is taught and will this improve the empathy levels of nursing students? One of New Zealand's founding documents is the Treaty of Waitangi, which established New Zealand as a bicultural country in 1840, however with increasing immigration, and refugee resettlement New Zealand is becoming a multi-cultural society (Bathurst & Edwards, 2011). Davi, Koss, Schmaltz and Loeb (2007) state that 50% of healthcare consumers who are culturally and linguistically diverse experience adverse health events. This statistic requires that action is taken to improve the health outcomes for these people. Students will use immersive virtual reality to experience the life of someone within a completely foreign healthcare setting. A modified version of the Kiersma-Chen Empathy Scale has been used to compare the empathy levels of a convenience sample of first and third year nursing students within a regional School of Nursing prior to and post these teachings. Preliminary results have shown that the majority of students' empathy levels improved following these lessons. These results are yet to be compared amongst year groups, as this is scheduled for the beginning of 2019.

Enhancing students' learning to solve word problems in Thermodynamics based on Newman's Error Analysis

Carlo Gabriel, Southern Institute of Technology

In the engineering curriculum, courses are highly based on understanding of fundamental concepts. The traditional lecture format of introductory engineering courses presents many challenges to both teaching and learning. This action research aims at improving the performance of eight New Zealand Diploma in Engineering (Mechanical) students enrolled in Thermodynamics through enhancement of their learning to solve word problems based from Newman's Error Analysis. With the researcher's length of experience in teaching engineering courses, it has been observed that solving mathematical word problems has been a major issue in engineering education. A common view among teachers and students is that worded problems in engineering courses, especially in Thermodynamics, is an area where most students have difficulties and eventually fail their papers. In this study, the researcher employed the Newman's Error Analysis (NEA) procedure to identify the errors of the students in solving mathematical word problems in Thermodynamics. From these identified errors, the researcher has developed a study guide designed to enhance the students' learning

of the course. The group of eight Year 1 students enrolled in DE5301 Thermodynamics were pre-tested and post-tested. The pre-test (diagnostic test) helped the researcher to identify the root cause of students' stumpy performance in solving mathematical word problems in Thermodynamics using the procedure of NEA. From the results of the post-tests (Progress Test), a statistical analysis determined if the intervention (developed study guide) had a significant effect. The researcher used this analysis in developing and testing the effectiveness of the study guide that was incorporated into the traditional procedure of lecturing the topic on mathematical word problems.

Putting it to Bed: Revising and completing A DIY feature film.

Patrick Gillies, Southern Institute of Technology

The expression, "One can't see the wood for the trees", holds true in art as it does in life. As practitioners, we are often so close to our work that it is hard to recognise its faults. *My Name Is Heather* is a no-budget DIY feature film that I first began making as part of my Master of Fine Arts thesis project in 2012. The film is a found-footage psychological-drama about a sex worker on the streets of earthquake-stricken Christchurch, struggling to turn her life around, whilst coping with a deadly stalker. Through the process of making this thesis film, I intended to explore techniques in diegetic filmmaking – essentially weaving together a narrative from mixed media formats – as well as testing the validity of the conventional Hollywood three act structure. Whilst an acceptable version of the film was completed within a year and submitted for assessment as part of my thesis, the film failed to find a positive response from film festivals and sat on the shelf for nearly four years. Fast-forward to mid-2017, and I found myself compelled to revise the film with a view to finding some kind of audience and, hopefully, gaining film festival selection. This presentation is a practice-based investigation into the process of finessing my feature film over a six-year period, detailing the revisions that I made to the story in order to more successfully resonate with an audience, as well as detailing some of the technical processes necessary to update the film for modern online audiences.

Folklore to reality? Global sea-level rise and the Maldivian "myth of extinction"

Christine Liang, Southern Institute of Technology

The Republic of Maldives, an atoll nation in the central Indian Ocean, consists of more than 1200 islands (of which ~200 are inhabited) perched on marginal reefs of atoll rims or platform reefs in the atoll lagoons. Maldivian folklore has foretold a myth of extinction whereby a great catastrophe ends with the island nation being swallowed by the surrounding sea. Now due to global warming and sea-level rise, there may be some truth to the myth: Former president Mohamed Nasheed stated in 2012 that "if we do not act now, my island nation will be submerged by the sea", referring to evidence that the Maldives could be completely inundated by the end of the century (Anthoff et al., 2010). IPCC sea level projections show a rise of between 0.3 and 1.8 m by 2100 (Oppenheimer et al., 2014), which overtops the height of very low-lying reef islands (Anthoff et al., 2010). In order to gain insights into the future resilience of these islands, this research looks at past clues from island formation during a period of sea-level rise 8000 years ago. The study investigates the formation of lagoonal reef islands in Huvadhoo Atoll, Maldives by employing coring, sedimentological analyses, radiocarbon dating and ground penetrating radar. Results question assertions of island vulnerability over the course of sea-level rise: reef islands are dynamic and not only able to adjust morphologically, their reefs are able to adjust ecologically to rising sea levels. Nevertheless, reef islands are potentially threatened by a number of climate change effects besides sea-level rise, including increased storm intensity, changes in ocean chemistry, and sea surface temperature rise (Oppenheimer et al., 2014). These factors could present barriers to reef health and sediment supply that morphological or ecological adjustments may not be able to overcome. Furthermore, island landforms may physically persist but socioeconomic ramifications need to be considered as well.

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Seeking clinical excellence through the implementation of an innovative peer coaching model in undergraduate nursing education.

Rebecca McDiarmid and Donna Burkett, Otago Polytechnic

Clinical skills are traditionally taught to undergraduate nurses via low fidelity simulation using a manikin in a laboratory or classroom environment by a teacher in small groups. However, this model of teaching focuses on the skill, with little consideration of the patient or the nursing context. Wanting to bridge this gap, we developed a student centred peer clinical coaching model specifically designed to help develop first-year students' clinical nursing skills, whilst enhancing third-year students' exposure to direction and delegation skills in preparation for them graduating into Registered Nurse practice. From this participatory action research, a comprehensive evaluation of the teaching and learning experience from the third year nursing student perspective was explored, of which preliminary findings we plan to present at this forum.

The value of e-portfolios for transition nursing students

Karyn Madden, Southern Institute of Technology

E-portfolios play an important role in tertiary education globally in the 21st Century. Studies have documented that e-portfolios boast the positive attribute of making learning visible and meaningful for students (Andrews & Cole, 2015; Rhodes, 2011). What is known about e-portfolios is largely derived from research undertaken in educational institutions (Batson, 2002; Beckers, Dolmons, & Merrienboer, 2016; Green, Wylie, & Jackson, 2013; Williams et al., 2008). Previous work has established that tertiary institutes are immersed with web-based technology, and that students from a young age are more technologically advanced compared to two decades ago (Rhodes, 2011). However, it has yet to be

understood if there is a link between student engagement and the ‘’value’’ e-portfolios offer, from the students perspective. The aim of this study was to explore students’ perspectives on the value of the e-portfolio platform for transition nursing students in the Bachelor of Nursing programme in a New Zealand tertiary institute. This study invited the opinions and individual experiences of ten voluntary participants who were eligible to commence the final paper of their three year Bachelor of Nursing Degree at the Institute. The data for this study was obtained through focus group sessions reflective of the qualitative action research paradigm. Analysis of the transcribed narrative followed Braun and Clarke’s (2006; 2013) six stage thematic analysis. The thematic analysis process captured the quintessence of the participants’ experiences using e-portfolios. This study identified four themes that emerged from the data: Ease of use/ Convenience, Supporting Technology, Feedback and Transparency. It was evident from the findings that the students did perceive there to be added value to their education from the use of an e-portfolio platform. The crucial conclusions of this study suggest a commonality with what is identified in the essence of the literature, this being that e-portfolios are identified as being a preferred method of obtaining evidence, and therefore add value to the students’ learning.

Longitudinal study examining the value of e-portfolios for students in an undergraduate nursing degree.

Karyn Madden, Lynda Harding, and Katrina Bowes, Southern Institute of Technology

Madden (2018) explored and examined the value of e-portfolios within the Bachelor of Nursing undergraduate programme. According to the Ministry of Health (n.d) e-portfolios are an electronic platform for students to record their work, share goals and achievements, reflect on learning progression and receive feedback promptly. E-portfolios also allow for portability. Findings from Madden (2018) recommended a longitudinal study be commenced examining the value students place on the e-portfolio concept. The rationale for this recommendation is based on the contradiction in the available literature on e-portfolios and the findings from Madden (2018). Further justification for this research was that Madden’s (2018) exploration of the value of e-portfolios occurred over a nine week duration, therefore, a longitudinal study is required for a more comprehensive examination of the value e-portfolios have for students in their tertiary training. Madden’s (2018) research indicated that

international support for e-portfolios has been associated with higher retention and success rates in tertiary education. The aim of this study is to explore and examine the value of e-portfolios from the students' perspective with the undergraduate Bachelor of Nursing programme, while also exploring the value of e-portfolios over a longitudinal study. Year 1 Bachelor of Nursing students will complete an online questionnaire, prior to the return of completed e-portfolios. The intention is yearly completion of a questionnaire over a three year duration. Participation in the study was voluntary. The questionnaire was presented to the students following the submission of their e-portfolios but prior to their grade being returned, to minimise potential bias (i.e. if the student did not receive the grade they were aiming for). Ethics approval was granted by the Southern Institute of Technology Human Research Ethics Committee. Data analysis will occur yearly, for three years, following the response of the online survey. A combination of statistical analysis and content analysis will occur to interpret the results. This is the presentation of the preliminary findings, following completion of data collection for year one of the longitudinal study.

Spatially mapping areas of water convergence to guide mitigation of farm contaminants in the Waituna Catchment

Tapuwa Marapara

Overland flow is cited as a key pathway for land based contamination to waterways in New Zealand and other parts around the world (McDowell, 2006; Deakin et al., 2016). However, ephemeral overland flow pathways generally converge before they reach a significant surface waterway or recharge groundwater. If mapped, the enhanced knowledge of these drainage pathways and areas of convergence across the landscape would assist regional councils and farmers to identify and prioritise where nutrient run-off could most effectively be mitigated for water quality improvement. This project evaluates whether Convergent Zone Mapping can be developed reliably through integrating existing information (high resolution Digital Elevation Models (DEMs), the River Environment Classification, soil data) to provide a hierarchy of place based priorities for applying mitigation strategies. The evaluation was carried out using the Land Use Capability Indicator (LUCI) modelling tool in the Waituna catchment in the Southland region of New Zealand. The LUCI tool was augmented to produce additional outputs that target zones of high accumulation of water, sediment and/or nutrients and Strahler stream

networks and individual stream reaches of sub-catchments. Areas of water convergence were identified to be widespread around the Waituna catchment. However, at large scale, priority should be placed where the cumulative flow is high, and this coincides with the fifth Strahler order. At farm scale priority should focus on all areas of flow convergence. Low-lying areas where there was no water convergence are mostly covered by forest land cover types or are intercepted by these land cover types which mitigate overland flow.

The measurement problem: Beetles and cats in boxes

Barnaby Pace, Otago Polytechnic and Southern Institute of Technology

The measurement problem, predominantly well known in the field of quantum mechanics, has far-reaching implications beyond that of the quantum system. This presentation will explore a real world application of the measurement problem, and through a series of 'thought experiments' demonstrate that the measurement problem appears in other environments beyond that of theoretical physics. The measurement problem in quantum mechanics is the problem of how and when a wave function collapses. The most well-known analysis of this phenomenon is Schrödinger's cat, a 'thought experiment' which examines how an item can hold multiple states as a superposition, which then collapses on measurement. This paradox will be explored in the context of how we perceive and measure quality within higher education, and at which point 'quality' as a concept collapses. Further, exploration will be given to how the observer and the interactions of that observer causes change in the level and depth of the quality being perceived. Finally, potential solutions to the measurement problem beyond the quantum system, but within the realm of education, will be explored.

Let's do this! Engaging Invercargill locals with climate change action

Anna Palliser, Southern Institute of Technology

The Paris Agreement on climate change entered into force in November 2016 after NZ, along with many other countries, had ratified (become a full participant to the agreement) (Ministry

for the Environment, 2018). The preamble of the Paris Agreement explains that ratified nations (or Parties) should "respect, promote and consider" the rights of indigenous people, local communities and human rights obligations when acting to address climate change (International Institute for Environment and Development, 2016). Article 7 of the agreement says action to adapt to climate change should follow a "participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems". This paper provides initial feedback on a current project, which is exploring how Invercargill local people are involved in climate change action. Planned data collection includes a survey of local understandings about climate change and climate change action, observations of two workshops on climate change action in Invercargill and a series of interviews with government agency representatives, iwi and relevant NGOs. An important focus of these interviews is how locals are engaged with initiatives for climate change action, where climate change action covers both adaptation and mitigation to climate change. This paper will discuss the data gathered prior to the date of the symposium. Processes of stakeholder engagement are viewed through the lens of environmental communication scholarship. This argues the importance of early engagement with stakeholders (Glasbergen, 2002), building trust between stakeholders and authority holders (Senecah, 2004) and making opportunities for stakeholders to question and challenge knowledge being presented to them (Daniels & Walker, 2012). Engaging locals in dialogue rather than transmitting information to them is of key importance in environmental communication (Lindenfeld et al, 2012). In fact, if information is merely transmitted to locals, this appears to undermine the citizen engagement and mobilisation that engenders social change and problem solving (Brulle, 2010). Consequently, this study focuses on the methods and approaches used in Invercargill to communicate with locals and involve them in climate change action.

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Assuming, playing, and de-roling as the patient! The commencement of a grounded theory study.

Jo Rhodes, Southern Institute of Technology

Ki te kahore he whakakitenga ka ngaro te iwi

Without foresight or vision, the people will be lost

Evidence of physiological harm and personal mental health risks can occur for non-educators as simulated or standardised patients and students during simulation encounters. However, the experiences of educators who for the purpose of learning and teaching assume, play and de-role as simulated patients is not often considered. Without an understanding of educators' experiences, it is not possible to appreciate the training, support and safety required.
The aim of this study is to develop a substantive theory that explains the process by which educators experience assuming, playing, and de-roling as simulated patients for the purpose of learning and teaching. This qualitative study, guided by constructivist grounded theory methodology will gather data using intensive semi-structured interviews from educators internationally who assume, play, and de-role as simulated patients. An insight into educators' experiences of assuming, playing, and de-roling as simulated patients will shed light on the broader impact for educators who use simulation modalities in their teaching. The availability of the results of this study to healthcare education providers potentially will guide development of simulation policies, simulation guidelines, and health professional curricula resulting in safety for educators and their students.

Issues in transitioning STEM students from secondary school to engineering programmes at SIT

Doug Rodgers, Southern Institute of Technology

There is a perception that base scientific knowledge from the secondary system is, for a proportion of first year students, not as embedded as was previously thought. Academic staff assume that students have a reasonable familiarity with key base concepts to build on during their first year of study. This assumption is in many cases incorrect and can often lead to student frustration and poor performance due to this assumption of competence being incorrect. Tutors have often made the comment that a proportion of students are poorly prepared for study in STEM (Science, Technology, Engineering and Mathematics) qualifications, particularly higher level engineering e.g. in the New Zealand Diploma of Engineering programme at SIT. This is despite having met the requisite entry criteria for programmes at this level. From discussions with academics in other Institutes, it is clear that SIT is not alone in this. Familiarity with the basic principles of physics and mathematics is often lacking and some fundamental assumed scientific knowledge seems poorly embedded.

Difficulties that students experience could include one or more of the following: the change of learning environment from secondary school, class size, independent study assumptions, living away from home, teaching styles and unidentified learning difficulties. I plan to identify some of the areas where students struggle and identify some possible strategies to assist students in their first year of study at tertiary level.

Framework for lean implementation in construction processes

Nilmini Thilakarathna, Otago Polytechnic

Non Value Adding Activities (NVAAs) generated in a construction process are recognized as one of its major weaknesses since they adversely affect its performance and efficiency and produce unwanted cost. Activities that do not add value to the final product are merely a waste and need to be minimized or eliminated altogether. The major reason for our inability to minimize NVAAs is our failure to recognize them. Lean construction is one of the attempts made to apply lean production principles to the construction industry to minimize NVAAs in its construction processes and maximize the value provided to clients. Lean is an innovative construction management approach which is linked closely to the overall life of a project to ensure its success. This paper presents a framework for implementing lean techniques and further propose a tool for determining the lean maturity of a construction project in the construction industry in order to minimize its non-value adding activities. A detailed literature review was carried out to investigate lean implementation in construction processes. Quantitative research techniques were adopted to collect data from three different surveys. Findings of the first survey revealed with examples, the existence of non-value adding activities in construction processes in the construction industry in Sri Lanka with the second survey revealing their level of implementing the lean techniques. The findings of the third survey map non-value adding activities against lean techniques and emphasize the need for developing a framework for implementing lean techniques that will minimize NVAAs in the construction processes. Based on the data collected from the three surveys, a framework for implementing lean techniques and a tool for assessing lean maturity of a construction project were developed. The paper concludes by identifying the most suitable lean techniques in different stages of

construction processes that will make them lean with minimum waste thereby ensuring their long term sustainability.