

GETTING ON TRACK FOR SUSTAINABILITY IN EDUCATION

Observations from the Unitec Environmental Sustainability Program

Clarke, C.¹ Preston, L.^{2,4} Phillips, D.^{2,3} and L. Fourie²

¹Department of Civil Engineering and ²Unitec Environmental Sustainability Project Committee, Unitec New Zealand, PO Box 92015, Mt Albert, Auckland, New Zealand

³Morphum Environmental Ltd, PO Box 99642, New Market, Auckland, New Zealand

⁴Epsom Normal Primary School 41 The Drive Epsom, Auckland, New Zealand

New Zealand is facing the requirement to adapt to global forces such as population growth and climate change. Across the country plans are being made in order to respond to the changes and the challenges that they carry. The long term aim is based on leading a high quality of life while maintaining a healthy environment for future generations. Education for sustainable development strives to embed sustainability in everyday lives.

Unitec New Zealand has embarked on implementation of a comprehensive Environmental Sustainability Strategy (ESS). They plan to act as advocates of practical sustainability across four key strategic areas within the institute – Teaching, Research, Advanced Practise and Campus (T.R.A.C.). “Teaching” focuses on the need to incorporate sustainability into the curriculum and use existing staff members and talent to offer a sustainability focus in every degree. “Research” is based on developing Unitec’s research ability relating to sustainable technologies from design to build with a transdisciplinary focus. “(Advanced Practice) Advocacy” aims to provide Leadership and make Unitec a centre of public information for community, staff member and student sustainability education. It also focuses on collaboration links with other best practice organisations locally, nationally and internationally. “Campus Management” intends to manage the Unitec campus to become a living example of sustainable best practice, in all aspects of the organisation’s function.

This paper explores the journey that Unitec is taking towards becoming a sustainable tertiary education institute.

1. INTRODUCTION - WHY SUSTAINABILITY IN EDUCATION?

Sustainability education is more than just building an understanding and awareness of global issues. It is about growing the values, knowledge and skills in order to think and act in ways that will support a sustainable environment and lifestyle. Sustainability education is aimed at creating future communities that value sustainable living, nurture the environment and recognise the interaction between social, cultural and economic aspects of sustainability. The need to normalise sustainable techniques and measures through education organisations is obvious. There is no shortage of issues, topics and learning opportunities in sustainability, they are all around us. Lifelong sustainable strategies, learning experiences, and planning ideas can be explored in sustainability education. We need to embed the tools for future effectiveness throughout our early educative life, from Primary School through to Tertiary Education.

This paper describes some of the history in sustainability education at Unitec Institute of Technology in Auckland, highlights issues for Tertiary sustainability education in New Zealand, and describes the Unitec Environmental Sustainability Strategy (ESS) being developed to improve sustainability across a tertiary education organisation.

2. BACKGROUND – UNITEC: SUSTAINABILITY IN EDUCATION

2.1. History

Unitec is a Technical Institute with a main campus in Mt Albert, and satellite campuses in Waitakere and North Shore in Auckland. Recorded sustainability initiatives at an institute level at Unitec began with Tim Rimmer undertaking a waste audit for the campus in 1992, with the results utilised in an attempt to implement waste minimization systems on the campus. Later considerable work was undertaken by Jeff Seadon including waste minimisation, with success in establishing recycling stations on the campus (e.g. Seadon, 2005). Unfortunately these recycling stations were later removed by the Facilities Management. Many examples of operational measures have been implemented to improve resource efficiency on campus however these have not been specifically aligned under a sustainability programme.

Teaching sustainability at Unitec included programmes in Environmental Engineering that aligned with sustainability (Tapp, *et al.*, 2002). These programmes offered the BE (Env) and DipEnvTech. In 2002, a sustainability group was formed within the then School of Engineering, which evolved to an initiative by David Thom in 2004 to develop and embed a sustainability component throughout every paper in the BE (Env), based on the concept from the Institution of Civil Engineers (ICE) that sustainability lies at the heart of civil engineers. A sustainability perspective was therefore embedded in lectures and also included in learning intentions, learning outcomes and examinations. Thom was also the founding member of USEF, “Unitec Educating for Sustainability Forum”. The forum was organised because like minds in the School for the Built Environment, Architecture, and Natural Sciences. A member of Unitec senior management, Dr J. Harman agreed on the need to foster progress in the teaching of sustainability at Unitec (Mamula-Stojnic and Panko, 2004; Napan and Mamula-Stojnic, 2005; Harman, 2006; Timmer, 2007). The Forum had monthly meetings and followed a programme for 2004 consisting of a quarterly newsletter, a series of seminars and workshops, and the preparation of a Unitec sustainability database. While complete traction throughout Unitec was not achieved, this assisted in setting the platform for future work by Logan Muller and Associate Professor Peter Mellalieu. Mellalieu gained senior leadership and executive support by conducting one of Unitec’s first comprehensive sustainability audits in 2007.

2.2. Recent Movements

The Unitec Sustainability Community of Practice (COP) was activated in May 2009 and the push to a sustainable movement began. Clive Cornford and David Coltman documented some of the background to Unitec’s past around environmental sustainability and presented an action plan to the Leadership Team in October 2009. On the 24th November 2009 Unitec held a Hui organized by Logan Muller, where over 25 Unitec departments were represented to contribute collaboratively to moving Unitec forward on its Strategy for Sustainability. The promoters of the Hui were aiming at a properly funded and resourced audit of all sustainability actions and initiatives at Unitec. It served as the first step in the collective process and a chance for wide stakeholder input.

Peter Mellalieu was a keynote speaker at the Hui. He discussed “Unitec and Sustainability since 2005: How we got where we are”. Mellalieu argued “we cannot rely on business or government to adopt the requisite level of policy regulation for sustainable development. Only informed professionals and opinion leaders will change the values, and thereby their purchasing and voting decisions of citizens to care for the environment” (Mellalieu, 2008a, 2008b, 2009, 2010). He pushed for the leaders and teachers of Unitec to take a step beyond what is stated in the Tertiary Education Strategy. Following the Hui, in March 2010, Logan Muller, Leon Fourie, Irene Allen and the Sustainability Cluster developed Terms of Reference (ToR) for Unitec’s Sustainability Strategy (Allen *et al.*, 2010). The purpose of the ToR was to provide direction for the necessary gathering of information, consultation, planning and implementation of a sustainability strategy for Unitec.

2.3. National Context for Tertiary Education Sustainability

In 2007, the NZ Parliamentary Commissioner for the Environment (PCE) reported that “University students understanding of sustainable development has not dramatically changed since 2002”. Also “initiatives for sustainability have largely been ad hoc, isolated, and uncoordinated within and across universities”. The PCE report does outline some examples of progress and achievement within some Tertiary Education Organisations (TEO), stating: “While environment-specific courses are available, with some offering good opportunities for skills and knowledge in sustainability, learning about sustainability is not a core (or even a fringe) component in most mainstream courses”.

A potential cause for this poor progress may be when campus sustainable development activities rely too much on ‘lone ranger’ champions, and fail to get adequate support from senior institutional leadership” (Williams, 2008). The Tertiary Education Strategy (TES, 2007-2012) highlights lack of investment in education for sustainability within TEO’s as an obvious constraint. The TES particularly acknowledges the importance of New Zealand tertiary education in assisting with developing sustainable use of natural resources (MoE, 2007).

Several New Zealand Tertiary Education Organisations (TEO’s) have announced commitments to Education for Sustainable Development in their practice and campus operations. Otago Polytechnic (Birnie *et al.*, 2008) and Waikato University are examples of successfully developing programmes. The Parliamentary Commission for the Environment reported in 2007, “Three universities in New Zealand offer teacher training in education for sustainability: Waikato University offers some pre-service training, and Canterbury and Massey Universities provide sustainability education programmes at a tertiary level.

Unitec has identified that while good work is underway, there is certainly opportunity to improve both the sustainability of academic institutions and the delivery of sustainability education.

3. UNITEC ENVIRONMENTAL SUSTAINABILITY STRATEGY

3.1. Development Process

Unitec NZ has embarked on implementation of a comprehensive Environmental Sustainability Strategy (ESS). They plan to act as advocates of practical sustainability across four key strategic areas within the institute – Teaching, Research, Advanced Practise and Campus (T.R.A.C.). The T.R.A.C. model reflects the work and advice form both the Hui and

the COP, now one body of nearly 100 staff at Unitec. A smaller Environmental Sustainability Project Committee led by Executive Dean: Leon Fourie encompassing a broad range of staff from various departments, including support services such as the library and importantly Facilities Management has since been formed to move the project forward. As part of the development of the consultation with staff it was felt necessary to involve independent environmental consultants. Not only would they help with the development and planning of the Environmental Sustainability Strategy (ESS) for Unitec, but also conduct an audit of the current sustainability activity. Morphem Environmental Ltd were engaged to assist Unitec in the development of an ESS in a collaborative fashion in accordance with the Terms of Reference (TOR), and integrated with the Unitec strategic practice areas.

The audit of current Unitec practices identified existing and potential sustainability initiatives. Audit interviews covered members from each department, and included the research department, library and Unitec campus and facilities management in order to get a wide perspective of current initiatives and potential initiatives in four areas of Teaching, Research, Advocacy and Campus as illustrated in Figure 1. Previous Unitec Sustainability audit documentation was considered. Other measurements were also taken as part of the audit e.g. operational data for electricity, natural gas and water consumption (Mt Albert campus only) which has been collected 2005-2009 and analyzed. These findings were presented in workshops by Caleb Clarke from Morphem Environmental Ltd.

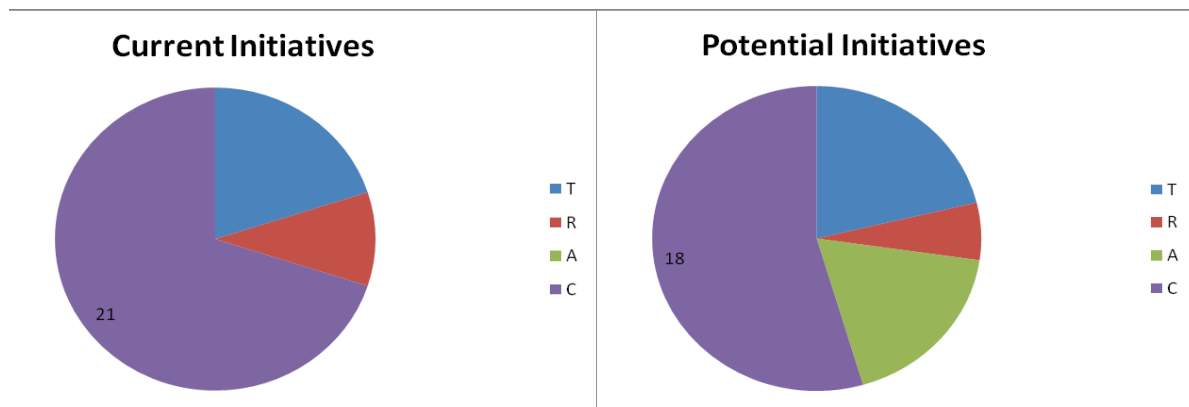


Figure 1: Current Sustainability Initiatives and Potential Initiatives identified from Audit Process (Source: Morphem Environmental, 2010).

A series of workshops and collaborations have resulted in the prioritization of potential initiatives and development of a Draft Environmental Sustainability Strategy produced at the time of writing. This is being progressed through Unitec Leadership approvals for implementation.

In order to maintain momentum and facilitate integration and ongoing collaboration the ESS is being developed and presented in a comprehensive ecoPortal™ software system (Figure 2). The model includes navigational wheels that outline current targets and objectives in each of the 4 key areas in line with ISO 1400 reporting frameworks. A project management and scheduling module allows monitoring of targets and measurements integrated with email communication.

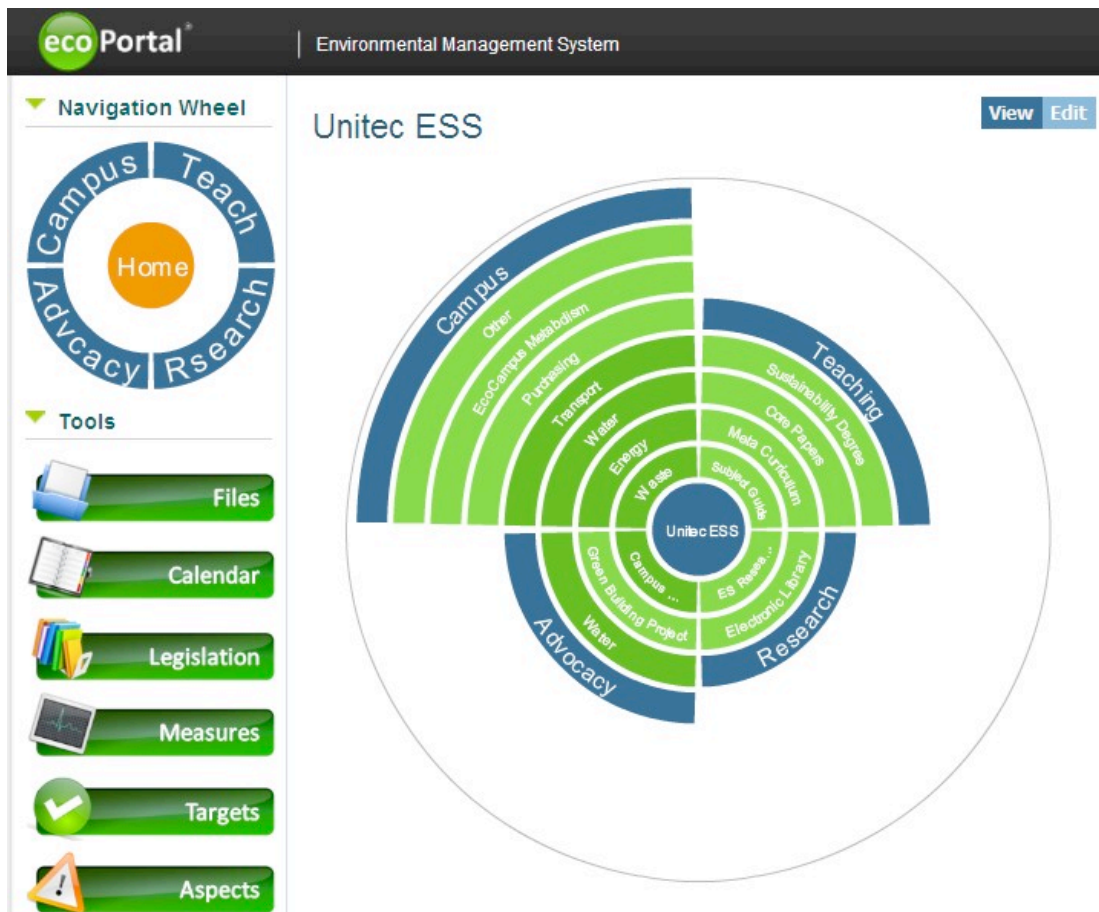


Figure 2: Preliminary Unitec Ecoportal Framework (Source: Morphem Environmental Ltd)

3.2. The TRAC Model - Unitecs Environmental Sustainability Strategy

The T.R.A.C. model has provided the guiding principles for the development of the Environmental Sustainability Strategy (ESS) at Unitec. The detailed descriptions are listed below and initial results of the audits (Morphum Environmental Ltd, 2010) are discussed with work still progressing on the final outcomes of the project:

- **Teaching** “Teaching” focuses on the need to incorporate sustainability into the curriculum and use existing staff members and talent to offer a sustainability focus in every degree.
- **Research** “Research” is based on developing Unitec’s research ability relating to sustainable technologies from design to build with a transdisciplinary focus.
- **Advanced Practice** “Advocacy” aims to provide leadership and develop Unitec as a centre of public information for community, staff member and student sustainability education. It also focuses on collaboration links with other best practice organisations locally, nationally and internationally.
- **Campus Management** intends to manage the Unitec campus to become a living example of sustainable best practice, in all aspects of the organisation’s function.

3.2.1. Teaching – “Greening Unitecs Curriculum”

The audit findings for “Teaching” recommended sustainable learning to be based on real information from measurement frameworks in representative New Zealand contexts, and practical sustainability examples. Unitec aims for every student to have exposure to these techniques with a “Trans Disciplinary Team Learning” focus on integration of environmental sustainability across Unitec, including cross discipline exercises.

Priority Actions for teaching sustainability at Unitec have been identified as follows:

- Development of a working group to guide the development of Unitec’s sustainability curriculum.
- Allocation of personnel resource to develop this “living curriculum”, potentially in the form of a transdisciplinary 'virtual' department to provide inter-departmental papers.
- Development of an ES subject guide with an information librarian resource allocation.
- Include sustainability objectives in course descriptors and move to including ES modules on core papers for all courses.
- Development of post graduate sustainability programmes.
- Support of other kinds of learning including seminars, short courses, professional courses, conferences

3.2.2. Research – “Plugging into Eco-innovation”

“Research” audit findings expressed the need to develop an Environmental Sustainability Research Theme that frames relevant contexts, and targets the gaps where industry and society will receive the greatest benefit. Specific interest in a grant programme is expressed, where support for research based on practical solutions for sustainability is available. Unitec also aims to build an electronic e’library which will manage new found research in sustainability. Research can provide a beacon for the challenge of sustainability; framing real world problems, developing and testing solutions and understanding how the solutions can be used in the human hand.

The Research area would target the gaps where industry and society will receive the greatest benefit, focusing research at Unitec, which has always been of an applied nature, on innovative solutions towards creating a sustainable society and a green economy. The Unitec ES research theme will be developed with the following features:

- Focus on the relationship of Unitec, the community, regional, national and global issues to identify gaps and opportunities for research at many levels. Aligning research with real world problems to leverage Unitec’s practical stance and develop project driven research that has local value, is useful, and is practical as a point of difference.
- Utilise on-campus opportunities such as measurement systems developed as part of Unitec’s Campus metabolism project to provide real world data to integrate with research programs.
- Look within the Unitec community to investigate individual and team attitudinal approaches to sustainability, including cross-discipline integration opportunities.
- Focus on attracting good teaching staff who are at the forefront of sustainability research, to develop teaching led research that can promote active learning.

- Adopt an existing research topic that has suitable transdisciplinary opportunities as a pilot and drive this forward under the ES Research Theme banner.

3.2.3. Advocacy - “Unitec as a microcosm of a super-eco-city”

“Advocacy” includes advanced practise, which is Unitec’s applied research, and is at the intersection of research, teaching and industry. For Unitec this relies on a connected organisation exercising its opportunities for leadership and influence. Unitec is well poised to contribute to the discussion on ‘Auckland’s Growing City’ by providing a microcosm ‘laboratory’ across all strands of the **TRAC** model. Advanced practise sustainability advocacy at Unitec will be implemented with an internal then external focus. Internal Advocacy will entail establishing processes for internal collaboration and cohesion, and the development and proving of the internal sustainability story. External Advocacy is the promoting and marketing of this story into the wider sustainability world. For example Unitec aims to engage with community, build awareness of the two natural springs on campus, and continue with the riparian planting to improve water quality though the Wairaka Stream which discharges into Oakley Creek.

Internal Advocacy

- An institutional level commitment to the Environmental Sustainability Strategy (ESS) by the Unitec leadership provides clear mandate.
- The ESS Project committee will continue to operate in a way that guides and manages environmental sustainability at Unitec, with working groups to lead initiatives.
- An Environmental Management System (EMS) approach will operate under the Health Safety and Environment Manager to coordinate and lead change within Unitec. This will need to integrate with trans-disciplinary developments of the Teaching and Research themes in the ESS, and facilitate openness, innovation and communication of the internal Unitec sustainability story.
- Building and department scale implementation of campus metabolism understandings and sustainability initiatives will focus on responsibilities and motivations for behavioural changes.

External Advocacy

- Promotion of Unitec’s ES to students and the wider community through external networking, community outreach projects, and potential green seminars and conferences.
- Undertake applied research projects that leverage internal learning for sustainable city innovations and outcomes.
- Developing internal information and knowledge is necessary to provide subject material for external advocacy.

3.2.4. Campus Operation – “Unitec as a biophysical entity”

“Campus Operation” is initially focussed on two areas of measurement and planning. Measurement involves the improved monitoring of energy, water and waste. Live metering and rapid feedback loops are a campus ‘measurement’ aim, which can provide data for business cases to improve resource efficiency, as well as drive behavioural change and provide information for research and teaching. Campus planning focuses on the intent to

develop the campus as a green learning classroom in a way that facilitates learning and advocates sustainability. This can permeate the campus planning from structure plan to precinct plans and building construction and refurbishment projects.

Some other objectives for campus management are:

- *Campus Waste: Development of inhouse recycling process including triple bin infrastructure. Increased education to staff/students and removal of individual bins by the end of 2010.*
- *Vehicles: Limit the number of cars on site. Offer incentives for carpooling and alternatives such as videoconferencing, provision of bikesheds and bicycles on campus.*

The campus infrastructure of Unitec includes three physical campuses in addition to a virtual campus extending across the community of 23,000 students, 1,100 staff and their spheres of influence. A measured and clearly understood sustainable campus metabolism will lead the development of Unitec as a green learning classroom, with best practice to flow into structure and precinct plans that facilitate learning and operational sustainability. This will include metabolism measurement and eco-campus planning elements as follows.

Metabolism Measurement

- Development of a 'green and smart campus'. Improved monitoring of energy, water and waste, including live metering and rapid feedback loops to facilitate interpretation and infrastructure and behaviour improvements. The scope will include instantaneous web and building displays of resource use figures.
- Development of feasibility assessment processes based on high resolution measurement including carbon equivalents, for better true-cost life cycle analysis of initiatives such as Building Management System retrofits. Many other ideas and opportunities have been identified and these can also be assessed for feasibility and prioritised for implementation.
- Focus on added value impact in providing examples to support valid Teaching, Research and Advocacy initiatives.

Campus Planning

- Review of structure planning resourced through the Architecture department including campus design studio to align with sustainable design principles.
- Create sustainable campus design guidelines, incorporating life cycle business case processes integrated with metabolism measurement.
- Commence flagship green building project within Building 48 refurbishment or trade schools precinct redevelopment.
- Maintain eco-campus focus including sustainable super city parallels, maximising signage, education and community integration opportunities.

4. CONCLUSION

Unitec NZ is an example of an education organization with a history of initiative in sustainability education and sustainability of education provision. Like many tertiary education organizations in New Zealand the has been mixed results in terms of continuity and effectiveness. Unitec is embarking on a comprehensive program to embed sustainability in its activities. Adoption of a holistic model allows simultaneous focus across all areas of Unitecs potential influence, the Teaching, Research, Advocacy and Campus Operation contained in the TRAC model.

The Unitec ESS is progressing with wide reaching audits on the campus of staff and current Unitec practices as well as an individual interview process and analysis of existing data through to collaborative workshops including a Hui, This inclusive process has shown that there are many areas where Unitec can implement positive change to the way it is currently working through potential sustainability initiatives. These ideas are currently being assessed and presented through tools such as an Ecoportal, with the final Environmental Sustainability Strategy to be developed throughout 2010.

This holistic approach not only places importance on managing the environmental footprint of the organisation, which is important to provide positive examples of sustainability and normalise these for students, but more importantly focuses on opportunities to change behaviours and to feed into greater stimulus towards sustainable practise within staff students and ultimately professional practise.

The challenge which Unitec Senior Management have embraced is to implement an Environmental Sustainability Strategy, to become a better tertiary education business and ultimately influence society.

REFERENCES

- Allen, I. De W Fourie, L. and Muller, L. 2010 Environmental Sustainability Strategy: Terms of Reference. March 2010. Unitec Institute of Technology.
- Auckland Regional Council,1999-2009 *Education for sustainability*, accessed 9/8/2010,http://www.arc.govt.nz/council/sustainability-education/environmental-education_home.cfm
- Auckland Regional Council, Auckland Regional Growth Forum, 2007, *Auckland Sustainability Framework. An Agenda for the Future*, accessed 9/8/2010, <http://www.arc.govt.nz/albany/fms/main/Documents/Auckland/Sustainability/Auckland%20Sustainability%20Framework.pdf>
- Auckland Regional Council, Regional Sustainable Development Forum, 2008, *Auckland Sustainability Framework Tool Kit*. accessed 9/8/2010 <http://www.aucklandoneplan.org.nz/subsites/fms/OnePlan/Supporting%20Documents/ASF/ASF%20Toolkit.pdf>
- Birnie C, Ellwood K, Henry S, Mann S, Pawlowski I, 2008 A Simple Pledge- Towards Sustainable Practice, Otago Polytechnic.

- Enviroschools* accessed 8/8/2010, <http://www.enviroschools.org.nz/> our organisation/ about-enviroschools/enviroschools-stats
- Harman, J., Mamula-Stojnic, L., & Ennis, I. 2006 Education for sustainability: Reflections on the efficacy of integrative studies courses in an undergraduate degree. *International Journal of Environmental, Cultural, Economic and Social Sustainability*, 2.
- Mellalieu, P. J. 2008 Investing in education for sustainability: An exploratory strategic audit of a tertiary educational organisation, Unitec Business School Working Paper Series, New Zealand Centre for Innovation and Entrepreneurship, Auckland: Unitec Institute of Technology, February, 2008.
- Mellalieu, P. J. 2008 Investing in education for eco-sustainability: A 'fast follower' strategic posture for Unitec Institute of Technology, Unitec Business School Working Paper Series, New Zealand Centre for Innovation & Entrepreneurship, Auckland: Unitec Institute of Technology. (2008). Paper available online at: <http://web.mac.com/petermellalieu/UBSPublications>
- Mellalieu, P. 2009 *Shifting frontiers, new priorities, creating pathways: elevating the case for tertiary education for sustainable development in New Zealand*. Wellington, New Zealand: Bright*Star Conferences & Training Ltd.
- Mellalieu, P. J. 2010 Unitec's Environmental Sustainability Strategy. Introducing the Unit Eco Prism. Presented to the Unitec Sustainability Hui. 2009.
- Morphum Environmental Ltd, 2010 Current Sustainability Initiatives and Potential Initiatives. Unpublished Technical Report.
- Napan, K., & Mamula-Stojnic, L. 2005 A process that empowers-self and peer assessment as a component of education for sustainability. In P. Kandlbinder (Ed.), *Making a difference: 2005 Evaluations and Assessment Conference refereed papers* (pp. 97-106). Sydney: University of Technology Sydney. Paper presented at the Fourth Annual Evaluations and Assessment Conference 'Making a difference', 30 November-1 December, Sydney.
- New Zealand Association for Environmental Education, *Resources and Links*, accessed 20/9/2010 <http://www.nzaee.org.nz/>
- New Zealand Ministry of Education (MoE), (2007). Tertiary education strategy 2007-12 - Incorporating statement of tertiary education priorities 2008-10, (TES) Wellington: Office of the Minister for Tertiary Education, ISBN 0-478-13613-7.
- Mamula-Stojnic, L., & Panko, M. 2004 *Sustainability: The education driver*. Paper presented at the International Conference on Sustainability Engineering and Science, 7-9 July, Auckland, New Zealand.
- Parliamentary Commissioner for the Environment. 2008 Annual Review for the Year Ended 30th June 2008. Government Printers, Wellington, NZ.

- Parliamentary Commissioner for the Environment. 2007 *See Change: Learning and education for sustainability: Outcome evaluation*. Government Printers, Wellington, NZ.
- Phillips, D. and Birchmore, R. 2009 *Sustainability in the Department of Civil Engineering*. Poster Paper at the Teaching and Research Symposium, Unitec 2009.
- Seadon, J. K. 2005 *From waste to sustainable waste management (keynote address)*. Paper presented at the New Zealand Institute of Food Science and Technology - Dairy Institute Association of New Zealand Conference, 28-30 June, Christchurch.
- Tapp, B., Mamula-Stojnic, L., Ennis, I., & Haines, L. 2002 *Education for sustainability - a systems approach*. Paper presented at the New Zealand Association for Environmental Education Conference, 17-19 January, Hamilton.
- Timmer, T. J. 2007 *Strong sustainability, its holistic roots and the need to educate for reconnection*. *The International Journal of Environment*.
- Morphum Environmental, 2010, *Unitec Environmental Sustainability Strategy (ESS) Ecoportal* accessed 30/8/2010, <http://www.unitec.ecoportal.co.nz/node/1>
- Williams, P. M, 2008, *University leadership for sustainability: An active dendritic framework for enabling connection and collaboration*. Victoria University of Wellington, accessed 1/8/2010, <http://www.futuresteps.co.nz/>