Co-creating sustainable design

Session 3

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Value Added: Education for Change

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The fashion and textile industry is faced with many challenges as it attempts to create a paradigm shift amongst designers, consumers and industry.

The role of a designer is complex and unique, as they are connected to multiple stages of a product’s life from raw materials, manufacturing and use. This places them in a strategic position to make many decisions; decisions that can ultimately be driven by ethics and values. Designers have the ability to greatly reduce the social and environmental impacts within their industry if they are motivated to. But how do you motivate people without overwhelming them with the complexities of the many challenges that lie ahead? It sounds obvious but perhaps education is the key; an early intervention to interrupt habits, an opportunity to examine the relationship between the design process and personal values, a chance for candid reflections about our interactions with everyday rituals and the communities in which we live.

This paper will examine and discuss how unexpected projects within a tertiary learning environment can facilitate shifts in thinking. Through my teaching practice in textile design I have become acutely aware of the critical need to provide a framework for engaging in values in order to assist students in assessing their current relationships with designing, making, consuming and wasting.

By fostering a genuine culture of optimism through design based studio projects, reflective writing, storytelling and interactive workshops, significant changes occurred amongst learners as they developed new ways of framing problems and reimagined the future. This approach has empowered students’ perceived ability to make a difference towards a sustainable future in fashion and textile industries. Surprising and inspirational stories of personal change emerged.

Through engaging in values students came to the conclusion that sustainability is less about having right or wrong answers but possessing the capacity and confidence to think deeply and critically about multifaceted needs and the space where environmental, social and economic wellbeing intersect. Values-based initiatives look for solutions and change and question the status quo. If we are asking future designers to look further than economics as a measure of success and become agents of change, then design education must provide a context for students to reflect, participate, adapt, collaborate, imagine, connect, plan and be curious about the need for designing a sustainable future.

Keywords: Fashion, Textiles, Design, Values, Education, Change
Value Added: Education for Change

Introduction

Fashion and textile graduates are faced with many challenges as they enter an industry in desperate need of change. Leading thinkers in the area of Sustainable fashion and textiles are asking questions such as:

“How can fashion become more environmentally and ecologically friendly? How can designers make a difference? How can we slow down fashion? How can we reconcile conflicting priorities in a fast moving industry? How can ethics and aesthetics be integrated?” (Black 2012, 11).

In recent years, design icons such as Stella McCartney and Vivienne Westwood have turned their attention to the issues of fast fashion and climate change. In a 2008 interview Westwood stated “if we do survive, we will have to change our thinking. Quickly or slowly, we are going to have to change our whole outlook on life, and learn not to want the things we think we want” (Stanley 2008, 99).

Sustainable consumption has been on the agenda for many global organisations for some time now, in 2002 at the World Summit on Sustainable Development it was acknowledged that, “fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. It called for all countries to promote sustainable consumption and production patterns” (UN 2015).

As a teacher in a large dual sector university, I feel a responsibility towards addressing some of these changes that the world is unanimously calling for. The University states “graduates will have engaged in processes to develop their abilities to recognise environmental and social impacts and to provide leadership on sustainable approaches to complex problems” (RMIT 2015). This is a good thing, but is it happening? If we are expecting our graduates to provide leadership on sustainable approaches to complex problems, somewhere in the curriculum students need a chance to ‘engage’ in these, so called, processes to build their confidence in tackling and talking about complicated sustainability concepts. This paper will discuss how in my teaching practice I have observed fundamental shifts in thinking amongst learners through personalised research and design based studio projects.

Context

In a tertiary setting students come with diverse experiences, knowledge and attitudes. They have different levels of understanding and various reasons for undertaking study. Some are aware of their values, however many are driven by a set of values they may not know exist (Management Consultancy International 2015) or be able to describe. All groups of learners have different values, which impacts on the learning and teaching strategies used. It’s clear that attempting to have a good understanding of your learners is crucial to the content and style of your training materials, especially if you prescribe to the constructivist view of learning, which suggests that learning is a process of making sense of things. It advocates the idea that “meaning is made by the individual and is dependant on the individuals previous and current knowledge structure” (Cafferella and Merriam 1998, 261).

This is why, for effective learning to take place, learning that facilitates change, there should be an emphasis on individualized learning and teaching strategies that tap into the experience of the learner. This view is also in accordance with Barrett Brown who believes that the meaningful process of communicating about sustainability “is to
carefully frame a sustainability message in a way that resonates with someone’s worldview, with their deepest values and motivations” (Brown 2005, 17).

One of the challenges then, in trying to create a shift in thinking amongst emerging designers, is working out how students can meaningfully connect with their learning experiences in order to change. In my experience when students are presented with a choice of sustainability focused research themes more often than not they want to explore topics unrelated to their discipline area. This may seem counter intuitive, but remarkably, when people experience the benefits of engaging in their sustainability values on a personal level it has a flow on effect into their design practice and changes start to occur.

Facilitating change and transformation through learning and teaching is one of the greatest challenges we face. How do we collaborate with students when dealing with wicked problems? What should learning look like when critical analysis reveals or creates even more complex problems seemingly taking you further from any solutions? We must define learning as a lifelong process and remind ourselves that sustainability is not a product or a fixed point. We need to help students build an understanding about their society and the world so they can see themselves as change agents and that is unlikely to happen using old teaching habits.

According to Bas Verplanken, “Successful habit change interventions involve “disrupting the environmental factors that automatically cue habit performance” (Verplanken and Wood 2006, 90). This idea is also in line with Garth Boomer’s philosophy about “Teaching against the grain: fighting institutional contamination” (Boomer 1985). Amongst many things Boomer argues that teaching is “probably the most massively habituated of all professions and the tertiary sector probably demonstrates this most dramatically” (Boomer 1985) He feels that “the deep seated habits of schooling have remained deep-seated because they work. They allow schools to do their job of socializing the citizenry into acceptable modes of behaviour and relating with values appropriate to the capitalist way of life” (Boomer 1985). But now we are asking students to re-think traditional values and to look further than economics as a measure of success.

This pattern of teaching habitually is undeniably true in many instances, which means we have to question where the innovation in learning and teaching is. Perhaps a starting point in transformative learning is for teachers to examine teaching and learning habits and identify where they could ‘interrupt’ the learner expectation of what is going to happen next.

Interrupting the norm

As an agent of change my teaching practice underwent a significant reawakening after learning about the principles of Education for Sustainability (EfS)². In 2012 I received a government-funded scholarship to undertake a Vocational Graduate Certificate in Education and Training for Sustainability. The course is designed primarily for teachers who seek to embed sustainability into learning programs and teaching practice. EfS is now an internationally recognised pedagogical platform for teaching in sustainability and its development is a result of the UN’s Decade of Education for Sustainable Development.

“In December 2002, the United Nations General Assembly proclaimed the years from 2005 to 2014 the Decade of Education for Sustainable Development (DESD)” (Australian

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Government 2015) and governments from around the world were asked to “strengthen their contribution to sustainability through a focus on education” (Australian Government 2015) In response, the strategy adopted by the Australian Government was to develop a National Action Plan for EFS. The action plan explains how EFS “aims to tackle the underlying causes of unsustainable trends” (DEWHA 2009, 8) and that “the focus is on systemic change” (DEWHA 2009, 8).

Using the principles of EFS, my teaching methods underwent a major overhaul. These principles became the basis for examining how I engage with students about sustainability and what I could do differently. EFS principles are important because they require a holistic approach that encourage the consideration of multifaceted relationships and the interconnectedness within systems; the fashion and textile industry plays host to some of the most complicated systems around, described by Sandy Black as being “a complex web of contradictory perceptions and practices” (Black 2012, 8), or Kate Fletcher who believes that “sustainability thinking is based on “a deep understanding of the patterns, networks, balances and cycles at play in the fashion system” (Fletcher and Grose 2011, 11).

The following case studies describe how I collaborated with colleagues, industry and the wider community in the pursuit of facilitating change amongst students who were working towards becoming design professionals.

**Case study 1 – Body Architecture**

A colleague and I deliver a project called ‘body architecture’. The project has two parts. The first explores the use of experimental textile techniques to create an article that can be worn on the body. The second part requires the development of an environmental management strategy detailing the origin of all materials used in the body architecture project, environmental impacts of processes undertaken, energy and water use, end of life options and the identification of opportunities to minimise impacts and increase resource efficiency. The report also requires the development of personal sustainability goals in relation to textile design practice.

Each year the project focuses on one fibre. The article must contain a component of that fibre and be acquired through reclaimed or recycled sources. This creates a design challenge, as all fibres have different limitations and opportunities, aesthetically and technically, and the materials, being recycled, are potentially not sourced through usual methods of a convenient cash transaction. Unwanted, discarded and found resources are now looked upon, not as waste but as having potential.

The first time we delivered the project we took a detailed approach and focused on wool. Before any practical work was undertaken a company who specialised in the manufacture and sales of merino products briefed the students about environmental, ethical and economic issues facing the wool industry. In particular, they provided solutions around fibre provenance and supply chain transparency in response to growing customer demands. They were committed to promoting sustainable farming practices and the ethical treatment of animals and their traceability program allowed for a woollen suit manufactured in Tokyo, for example, to be connected to the farm where the wool was originally from.

The company connected us with a fine merino wool farm, which we visited when shearing was taking place. The students were able to ask questions of the farmer, wool classer and shearers about agricultural practices, ethics and the future of the wool industry. Through this they were able to gain a better understanding of how certain
environmental factors affect wool quality, which can then impact on the market value and witness firsthand rural life on a big sheep farm. We then visited the Australian Wool Testing Authority to learn how wool is tested and processed and discussed the competitive features of wool and synthetic fibres, and how that affects global fibre demand.

Back in the studio Recycled woollen jumpers, discarded yarn, surplus salvaged yardage and found wool tops were being felted, printed, woven, knitted, dyed, moulded, twisted, cut and merged with other materials into new and exciting forms. Knowledge was built through experience; the combination of field trips, process of making via the body architecture workshops and developing the environmental strategy provided a holistic and experiential approach to investigating wool. The final stage of the project culminated in an exhibition at the National Wool Museum in Geelong.

Materials were at the heart of the project as it has been broadly identified that having a good understanding of raw materials could impact significantly on the sustainability credentials of a textile product. Material selection is sighted by experts as being a crucial component of sustainable fashion and textile design, explained here by Kate Fletcher and Linda Grose.

“Ours is a material world, and materials are essential to sustainability ideas; materials are the tangible synthesis of resource flows, energy use and labour. They visibly connect us to many of the big issues of our times: climate change, waste creation and water poverty can all be traced back somehow to the use and processing of and demand for materials” (2011, 12).

The significance of the body architecture project was that students came to the understanding that, sustainability is less about possessing right or wrong answers; it is about developing the skills to think critically and deeply about complex situations and increasing knowledge by exploring and considering the whole picture. It also helped foster a deeper connection with materials. Best practice in textile design is partly about having a good understanding of raw materials and respecting their value, so emerging designers must be aware of the implications or benefits of using particular fibres, for environmental and economic reasons.

The project reinforced that products don’t just place themselves on shelves; there are people, animals and land connected to the everyday materials we use and wear. A space was created for students to direct their own learning and develop new ways of assembling and using resources. It explored opportunities for emerging designers to extend beyond their traditional role.

**Case study 2 – Sustainability in Practice (Storytelling)**

Most recently in our sustainability class students went without plastic for one month ate local edible weeds, exposed the details of their household food waste, did volunteer work and took part in a composting workshop. Just to clear up any misconceptions about what was actually going on in class, no one was forced to go without plastic, or eat weeds or reveal how wasteful they were with food. Students were allowed the freedom to research any sustainability theme they liked. The research was shared with the class, with the emphasis being on the narrative and the personalisation of the topic – rather than facts and figures from distant places, this was about how the individual connected to sustainability on an everyday level.
You might ask what this has to do with fashion and textiles. How does monitoring your household food waste or eating weeds help with becoming an innovative designer? The obvious answer is nothing; however what all these activities did is create an opportunity for students to examine and share personal values, reflect on their interactions with ordinary rituals and create links to sustainable design strategies.

This project provided a framework for students to become involved with any sustainability issue and allowed them to discover a personal interest, beyond fashion and textiles. I observed students working with diverse themes and creatively engaging the class in their research. Students were encouraged to volunteer with a community group or organisation, conduct workshops with groups in or outside of the University or take part in events. In other words, actively participate on an individual and local level.

The student presentations were personal, reflective, informative, interactive, surprising, poignant and sometimes funny. Above all, links were made between the student’s personal values and design practice. Food waste was linked to textile waste, edible weeds to localisation and slow textiles, compost to closed loop systems being utilised in textile design and a month without plastic to recycling, chemical reduction and packaging – all concerns within current fashion and textiles systems. It was clear that students value the rituals in their life and the significance of exploring and sharing their experiences was instrumental in facilitating change.

Case study 3 – Most Significant change

In an attempt to formerly capture the extent of the change occurring in class I asked students to articulate in writing, “What they were currently doing differently as a result of participating in this course?” Typical answers fell into two categories; thinking and doing. It’s perhaps no surprise that there were more people in the ‘thinking’ category; for example; re-thinking choices, or wanting to change certain behaviours were characteristic responses for this group. However, a few forward-thinking individuals claimed to have changed habits as a result.

More students were thinking about change rather than actively participating, however according to Stuart Hill, “depending on one’s personality preferences and beliefs, such changes may be experienced as primarily involving thinking, feeling, behaviouristic, intuitive, and/or spiritual experiences and processes” (Hill 2008). This means that the role of feelings and thoughts play an important part in the process of transformation. On this basis, I can assume that change was taking place; a seed had been planted.

It’s widely accepted that “the most significant learning involves critical premise reflection of premises about oneself” (Mezirow 1991, 168), and through my own experience as a student (in the Vocational Graduate Certificate in EfS), I learnt about an alternative way to engage students in reflecting on their learning and personal change. The process is called “most significant change” (Davies and Dart 2005, 8) and calls on learners to write about the change that took place after participating in the learning. Change is defined in domains and can refer to, change in your quality of life, change in the nature of participation in activities, change in the sustainability of your organisation, change in your knowledge and awareness or change in your views and values (Davies and Dart 2005, 17). Students are asked to describe what the change was/is, how it took place and the significance of the change to them.

These reflective pieces of writing are compelling and revealing. This is what I mean when I talk about being able to’ read the change’. Students have written about feeling liberated, some even describing having an increased quality of life. Maybe this change
is fleeting, but maybe it isn’t? Can a student demonstrate all the ‘right’ attributes for pursuing a sustainable future during study and then abandon their fledgling beliefs upon entering ‘the real world’? Educators cannot be responsible for assessing students on their attainment of particular views and values or actions they take after their education. But we can ask students to reflect, participate, adapt, collaborate, imagine, connect and be curious in our pursuit of a sustainable future, and most importantly provide the opportunity to do this.

**Facilitation Strategies to promote transformation:**

The strategies I used in the above case studies to promote change amongst learners were:

- Assist students in gaining a more profound understanding of the interrelationships between fibre production, the fashion and textile industry, society and environment.
- Empower students with knowledge through making, engaging with different sectors of industry and critical reading and writing
- Challenge existing attitudes and habits by asking students to suggest strategies for change or identify areas for improvement
- Freedom of choice in research topics
- Create an environment where honesty and openness are respected
- Support a participatory and collaborative learning environment
- Include learning activities that encourage reflection and problem solving
- Cultivate a culture of optimism

**Conclusion**

This paper has discussed the function education can have in developing students’ ability to recognise the need for change. Education can provide a framework for engaging in values in order to assist students in assessing their current relationships with designing, making, consuming and wasting. Stephen Sterling conclusively states, “the difference between a sustainable and a chaotic future is learning” (Sterling 2001, 10).

Design is fundamentally about problem solving and in particular, being able to develop individual ideas, opinions and perspectives in many different contexts and scenarios. For graduates to successfully survive in industry they must demonstrate their capacity to respond to complex sustainability problems. “Designers will become strategists and comfortably work alongside economists, policy-makers, ecologists, business leaders and scientists, working collaboratively to influence positive societal and cultural change” (Fletcher and Grose 2011, 181).

There is no doubt the fashion and textile industry is confronted with many challenges as it calls for a shift in thinking on a global level. Therefore education must provide “activities that encourage the exploration of alternative perspectives, problem posing and critical reflection” (Taylor 1998). Key directions for the industry are sighted as moving “towards a holistic view, with an acknowledgement that it is no longer enough to resolve one aspect – we must address everything from the source of the raw material through design, production, use and re-use of materials and products” (O’Mahony 2012, 307).

The future of sustainable fashion and textiles lies in being able to see the whole picture and understanding the connections behind what is being produced (Chapman and Gant 2007, 131). Education can, and should play a critical role in helping students see, experience and reflect on the entire picture in order to participate in sustainable
approaches to design, after all this is a guarantee made by the University where I work. Sustainability is the space where creativity, common sense, innovation and compassion can exist and the need for change is now.

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Scales, spheres and relationships: an approach to educating future designers

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In this paper we argue that the current conceptions of sustainability through the Triple Bottom Line are limited, resulting in the social and environmental bottom lines being traded off against economic concerns. Design education reinforces a linear reductionist paradigm of practice. When applied to design for sustainability this paradigm echoes the prioritisation of the economic bottom line through eco-efficient design. So when students are confronted by the complexity of wicked problems and sustainability, they can become overwhelmed and default to eco-efficiency solutions.

Our insights are drawn from critical reflection on design education for sustainability practice, a literature review of design education for sustainability and a reflective workshop with education practitioners. These insights have led us to develop a reflective framework of six spheres to enable a more holistic understanding of design for sustainability. By visualising these spheres as interconnected, students and designers can engage in constructive reflection and conversations about their ideas in a world of complexity and interconnectedness.

Keywords: design education, sustainability, wicked problems, visualisation, scaffolding
1. Introduction

This paper shares insights that arose from teaching sustainability in design. We identified four key interrelated problems. In triple bottom line sustainability, the social and environmental bottom lines are ‘traded off’ in favour of the economic bottom line. Design education for sustainability also focuses on eco-efficiency to solve sustainability problems. Furthermore, because design education traditionally focuses on linear problem solving, this means that students are poorly equipped and are potentially overwhelmed by the complexity of ‘wicked problems’ and achieving genuine tripartite sustainability. We explore these problems in more detail through a critique of the triple bottom line and proposing a broadened working definition of six spheres. We also examine the issues with linear problem solving in design and the tensions inherent in wicked problems and how this is reinforced in design education and limits holistic thinking. To counter these difficulties, we propose six spheres of sustainability and a visual framework to enable students to engage with complexity in a constructive and reflective manner. We propose that the importance of building capacity in students as future designers means that they need to ask critical questions in order to locate their own possible points of design intervention among the spheres of interconnectedness. This reflexive approach necessitates that students begin by consciously designing themselves, so that design becomes an inward movement of change rather than an external one of changing systems, products or behaviours. We suggest that a classroom can be a safe – yet challenging – environment to scaffold ways for students to start the interventions they need to make to themselves and their everyday practices to achieve genuine sustainability.

This paper draws on insights from reflection by the authors upon their teaching practices combined with evaluation of the literature on sustainability and design. Design educators in Melbourne, Australia were invited from Monash, Melbourne, Swinburne and RMIT University to share their teaching practice in a three-hour workshop. The participants teach theoretical and practical courses related to sustainability and shared what they considered as important approaches to teaching sustainability through three methods, dimensions, resources, and activities that they use. Participants had in common a personal commitment for bringing sustainability into design education rather than an institutional or curriculum obligation. This echoes Ramirez’s findings (2006, 2007) that evidence a gap between institutional and theoretical understandings of sustainability and the way in which it is articulated to learning and teaching activities.

The framework for teaching sustainability proposed in this paper was developed from the conversation with workshop participants, and is intended to be trialled in class early in 2015. At the point of this paper’s publication, we can only speculate about its application but the outcomes will be documented and shared at a later date.

1.1 Critique of sustainability

In reading the design literature, we became critical of a view that ultimately limits sustainability to the economic bottom line through eco-efficient design. In the past, various design practices have promoted and branded sustainability as ‘green design’, ‘eco design’ and ‘environmental design’ (Magde 1993; 1997), which has narrowed its concern towards natural resource consumption and environmental impact. Walker (2011) further laments how the notion of ‘design for sustainability’ still perpetuates patterns of consumption albeit using less resource intensive materials or cleaner technology which follows an eco-efficiency mindset. Following the Brundtland Commission report, attempts have been made to use the Triple Bottom Line framework...
To counter these issues and limitations, the literature reflects a moving away from the triple bottom line revealing a desire to expand the definition of sustainability. Studies by various authors propose alternative frameworks, all concerned with broadening and specifying different categories. Partidario and colleagues (2010) articulate qualities such as the material, moral and cultural together with the qualities landscapes, livelihoods, and lifestyles. Emotional dimensions are also included in the framework by Sipos and colleagues in their discussion of ‘transformative sustainability learning’ that engages the head, hands and heart (Sipos et al 2008, 68). They explain that the approach is to integrate ‘trans-disciplinary study (head); practical skill sharing and development (hands); and translation of passion and values into behaviour (heart)’. Similarly, Walker (2011) adds ‘personal meaning’ as a fourth ingredient to ensure sustainability is relevant and meaningful to an individual person. And building on Inayatullah (2009), Walker (2014) further suggests the inclusion of spiritual well-being.

1.2 Problems with design education for sustainability – broken relationships

Design methodology is often represented by two models: a linear model and a wicked model. The linear model features two distinct phases of problem definition and problem solution in a logical sequence of analysis and synthesis yielding a successful outcome. This assumes that a boundary exists around a problem, which a designer skillfully demarcates and then solves (Buchanan 1992). The double diamond (The Design Council 2007) is a popular model and example that demonstrates this linearity, indicating a process that moves in one direction, with a resolution at the end. In contrast, Rittel’s wicked problems (Rittel and Webber 1973) are moving targets of interlocking issues, interests and constraints. There are no definitive conditions or demarcation to a wicked problem, and every ‘wicked problem’ is a symptom of another, ‘higher level’ problem.

The tension between these two models manifests in contemporary discussion of design. A number of recent studies show that there are many forms of design process (Sauder d.studio 2014, Tan 2008). But as Tan points out, these design processes and their visualisation tend to be largely the same and mostly about providing an insight on the design process to the outsider. What happens inside these processes is rarely revealed and harder to describe. In most cases these processes have a reducing quality, narrowing down to an appropriate solution. Birkeland (2002) critiques the dominant linear paradigm of design as leading designers to unconsciously express values that are in opposition to a systems or ecological view. The dominant paradigm features: linear progress; individual autonomy; essentialism; reductionism; mechanism; instrumentalism; hierarchical dualism; anthropocentrism and linear causality (ibid). Models such as the double diamond has echoes of reductionism, and while there are attempts to include systemic thinking, a more holistic view of the situation is neglected. The abstraction of the double diamond gives a perception of certainty and a logical understanding of a design process. In other words, the ‘wickedness’, including conflicting values of stakeholders and shifting sands of context, are surgically removed.
Regardless of the overall design process in use, the more interesting question is: what guiding principles could help designers and design students to think ‘holistically’?

The tension between linear thinking and wicked problems continues in design education. The symptoms of an unsustainable practices – such as levels of energy and water consumption, unsustainable food production methods, rising atmospheric temperatures etc., are presented to students as ‘problems’ to attempt to ‘solve’ through their particular discipline (industrial, graphic, fashion, urban design). In this regard, the brief, which is a standard industry practice of formalising a framework, documents the clients’ problem context and a set of issues for consideration or presents a hypothesis that details the features of a solution that can address the problem.

While design education necessitates the opening and closing of a studio brief, requiring a ‘finished’ outcome suggests finality to the process. While Life Cycle Assessment (LCA) and design for disassembly asks the student to think about the broader relationship of the artefact to the world, as we found from the educators workshop, the lens is often still an environmental one. We found that teaching practices are still focused on the triple bottom line, and while there are exceptions, most focused upon technological solutions and commercial products. From our own teaching practice we have noted that without scaffolding to confront the wickedness and complexity of the broader issues, students can become overwhelmed and disempowered.

2. Spheres and scales visualised

We have combined six spheres – social, political, economic, environmental, technological, and spiritual – as they are continually repeated in literature but in different ways. We see that each of these spheres is interrelated, influence one another, and cannot be isolated or segregated which we illustrate now. The social, economic and environmental spheres carry over from the triple bottom line, however we see these as overlapping and connected with all other spheres.

The economic sphere includes alternative and sharing economies such as peer-to-peer transactions and time banking that bridge towards the social sphere. From the concern for conservation of biological and ecological systems, the environmental sphere also draws upon an evolving history of consideration in design to the point where it attempts to dematerialise what is designed. This again links towards the economic and social spheres through sharing economies. The social sphere includes key ideas of equity, health, education, social cohesion, well-being, community and self-determination.

The political sphere encompasses democracy, structures of power, governance at state, national and global scales as well as the personal scale as activist, mediator or promoter of political ideologies, knowingly or unknowingly. Participation and advocacy are also features of this sphere. The technological sphere encompasses tools and manipulation of materials. It acknowledges the fundamental historical link between design, mass production and planned obsolescence. However the democratisation of technology brings the scale down from mass production to cultures of making locally and the re-emergence of craft. The spiritual sphere is not a religious framework, but a form of self-awareness, self-development and mindfulness nurtured in the every-day encounters of the world. Terms like ‘growth’, ‘being’ and ‘becoming’ (Inayatullah 2009; Ingold & Gatt, 2013) emerges in this sphere, where sustainability is seen as a personal journey and learning process instead of an ideal fixed set of goals and outcomes (Tovey, 2009).
These examples illustrate that these spheres are complex and the edges are fuzzy. The value as a reflective framework is in considering and questioning: what is the role of each sphere; how is it manifested and to what ends?

Our visualisation of these six spheres was partly inspired by the *Circuit of culture* (Du Gay et al. 1997), which features five aspects: representation; identity; production; consumption; and regulation, each connected to the other. A cultural artefact cannot be examined only from one aspect alone as they are interrelated. We also believe that the six spheres identified are interrelated and cannot be disentangled. We use dotted instead of solid lines to show each of the six spheres connected with all others and give a sense of the fuzziness between the spheres (fig 1).

![Diagram of Six Spheres of Sustainability](image)

**Figure 1**: Six spheres of sustainability

The six spheres operate at and move through different scales. The scales we propose in this paper are drawn primarily from two frameworks: the *Health Map* (Barton and Grant 2006), and *permaculture design zones* (Holmgren 2002, xxvii–xxviii). The *Health Map* shows how an individual’s health and wellbeing is impacted by environmental factors. For example, transport options in the built environment influence patterns of travel (such as walking or driving) at the personal level, which in turn has flow on effects on air quality at the local and community levels, as well as contributing to levels of greenhouse gas emissions at the global level (fig 2).
Holmgren’s further adaptation of *permaculture design zones* asks people to consider the world at different scales. At the personal or household *zone* one has the most direct influence over personal circumstance, moving out to the global *zone* where uncertainty increases and personal influence decreases (fig 3).

Both frameworks aim to aid the user to think critically about the action they take in the world; the *Health Map* as a ‘tool that provides a basis for dialogue and provokes...’
enquiry’ (Barton and Grant 2006, 252–253) and permaculture design zones as a meta-analysis of physical, geographical and conceptual zones for people ‘to better understand their world and to act both for themselves and for the future’ (Holmgren 2002, xxviii).

We propose a simplified version of these to consider the different scales design can intervene in and flow through (fig 4).

![Figure 4: Scales](image)

### 3: Designing re-connectedness – a reflective framework

Designing re-connectedness is a proposition in design education to equip students with methods, theory, frameworks and mindsets that enable their own pathway of inquiry and develop a change-making practice. In an attempt to prevent students from being overwhelmed by the ‘wicked’ complexity and an over-saturation of fear and facts, we propose a way to initially position the student-designer’s entry points into a ‘wicked problem’.

The framework includes diagramming six spheres and scales to aid a holistic awareness of sustainability, and to promote ongoing conversation about the nature of designing for wicked problems. Reflection upon critical incidents throughout the semester is also included, to support deeper understanding of their personal development. And by adopting a more open-ended approach with the design brief we encourage the understanding that a design project is open ended, dynamic and never truly complete. For this paper we will focus on the spheres and scales and illustrate how it might be applied in practice.

The aim is to keep all six spheres entangled in sustainability in view, and for students to locate their evolving design ideas as a working hypothesis for exploration and development. The idea is placed in the centre connected to all the spheres. We use the word ‘resolutions’ instead of ‘solutions’, after Horn and Weber’s mess maps (2007) due to the impossibility of creating a permanent solution to wicked problems (fig 5).
The example shown (fig 6) is a prototype of how the spheres might be used to analyse a project idea. Students are not asked to address all sphere and scales but instead to identify where their proposed project is located and consider what each sphere means in the context of their knowledge and ideas.
In considering how a sphere relates to their project or how each sphere is addressed by their ideas, students can write notes and questions, use distance and scale and other diagrammatic or expressive devices to illustrate the relationship of spheres to their project. Students might also consider at what scale their idea might be placed and how it might connect to other scales (fig 7).

Figure 7: Scales in practice

The tool is not intended as a finished communication device to be easily read by another person: creating mess is part of the process. Mess maps (Horn and Weber 2007) are used to aid participants in identifying the complexity and causes of wicked problems. The process is one of ongoing conversation with others and the process of mapping. Mess maps are not necessarily legible to external people, but are a critical tool for those involved.

This approach aims to assist with questions, reflects and communicates the student-designer’s awareness, perspective and concerns, and helps to reveal their systemic relationship and personal responsiveness to the spheres they are entangled within. It is also a means of engaging students in an ongoing conversation in the complexity of the project space, help externalise the potentially overwhelming nature of the projects, and recognise that the work is ongoing, dynamic, iterative and positioned in a broader context.

Conclusion

Following concerns about the limitations of the triple bottom line, we propose a broadened view of sustainability through six spheres: environmental; social; technological; economic; political; and spiritual, and understanding these as interconnected inseparable frames of the world. In teaching design for sustainability, issues arise around the focus upon ecological interventions, the potential to overwhelm students with the complexity and wickedness of the terrain and possibly stifling students or leading them towards implementing predefined toolsets in uncritical or unreflective ways. Building upon the six spheres we propose a visual framework to scaffold student understanding of the complexity of designing for sustainability and
wicked problems and then constructively engage with this through reflective mapping and diagramming.

We invite readers to apply this framework and to share their findings and variations upon the framework. This proposed framework will be applied in a communication design course in 2015, with the aim to further examine and critique our teaching approaches. We hope to present our findings in future publications.

References


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Sustainable Design Thinking on Country: Values for a Critical Ecology of Waste

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Sustainable Design, Indigenous and Environmental studies

Since 2013 students from Master of Sustainable Design have been involved in field trips to Camp Coorong, Raukkan and the Wilderness Lodge as part of experiential learning and community engagement programs. Situated on the shores of Lake Alexandrina the Raukkan Community (Raukkan means ancient meeting place) has an approximate population of about 200 people. The core principles of the community include:

- The development and maintenance of sustainable and mutually beneficial relationships,
- A holistic approach that supports the physical, social, financial, emotional, intellectual and spiritual growth of individuals and the community
- All initiatives and activities are developed with regard to their long term sustainability and responsible use of all resources

The collaborative partnership between Raukkan, The School of Art, Architecture and Design and the David Unaipon College (UniSA) focuses on design projects associated with the development of a healthy and resilient community grounded on the interconnected and holistic nature of the Ngarrindjeri worldview and sustainable design thinking. We argue that the acknowledgement and understanding of differing worldviews (including Indigenous Knowledges, western ecological thought and contemporary science) combined with an open brief pedagogical approach inspires alternative ideas informed by multiple ways of knowing through experiential learning ‘on country’. Learning on country offers students opportunities for the acknowledgement of an awareness of our interdependence and embeddedness in the natural world. This movement towards an understanding that we are cohabitants of a vast earth community recognises the imperative for designers to take a leading custodial role through design propositions promoting values that consider “waste” in its broadest context. Such a living eco-consciousness develops a deep inner knowledge of the systems and cycles of the natural order, and together with a fundamental understanding of health and wellbeing offers a foundation for developing a design ecology of waste that acknowledges the past and respects the future. An example from student feedback (2013) of an outcome from the ‘open brief’ sustainable design thinking below shows the potential for integrated economic, social and environmental design propositions.

Working with Aboriginal elders I discovered that design to them is a different definition to what the traditional education system teaches. I now think of my design within the context of impacting seven generations into the future and how best I can design for that based on understanding of key traditions and values held by a collective.

Keywords: Waste, Values, Cooperation, Interconnectedness, Worldviews
The greatest art in theoretical and practical life consists in changing the problem to a postulate; that way one succeeds. (Goethe cited in Cassirer, 1953, p.371) In keeping with Goethe’s thought we situate our dialogue in the premise that “Waste does not exist” and it is always something else. As there is no waste in nature we contend that the notion of waste is a human invention and suggest that the very use of that terminology negates a range of possibilities for the integrity and development of sustainable design ideas. From this vantage point we approach our discussion from within a systems perspective whereby human societies are embedded in complex and reciprocal interactions with the natural world. In this sense, we argue that humans are not separate from nature and that organisms and environment are mutually interconnected as parts of a broader web of parts and wholes. The French psychoanalyst Felix Guattari (2000, 28) introduced the idea of an ecosophy as an antidote to the present predilection for tackling waste from technocratic and economic perspectives only. He suggests a dialogue between the integrated ecological registers of the environment, social relations, and human subjectivity that must be addressed in order to explicate many of the dangers that continue to threaten the natural environments that we so clearly depend. On this foundation, we argue for a critical ecology of waste that foregrounds a system of values located in an ethic of respect from within our interconnectedness to the natural world.

The **Yuntuwarrin - Learning together on country** project explores the educational processes and benefits of reciprocal and collaborative learning between the Raukkan community, the Ngarrindjeri Land and Progress Association (Camp Coorong), staff and students of the Masters of Sustainable Design program in the School of Art, Architecture and Design (AAD) and the David Unaipon College of Indigenous Education and Research (DUCIER). Building on a number of different educational initiatives and community engagement programs the project develops a learning framework that combines an experience of Indigenous knowledges and worldviews with contemporary sustainable design education from within a real world experience. The township of Raukkan was founded in 1859 by the Aborigines Friends Association as the Point McLeay Mission and the governance of the community has been administered by the Community Council since 1982. Since that time the community has continued to be involved in various commercial activities including cropping and beef cattle, a nursery associated with natural resource management and Landcare programs, housing projects, the continuing development and maintenance of infrastructure, and a café, all of which includes training and employment for people residing in the community.

In 2013/2014, Master of Sustainable Design students participated in a variety of learning activities such as smoking ceremonies, traditional weaving, bush tucker walks, historical tours, exploring the Coorong wilderness, listening to and talking with community elders and leaders about future educational aspirations and the challenges facing the people. Interaction with Ngarrindjeri people was facilitated by two separate Three-day field trips to the Raukkan Community and Camp Coorong and this provided students with an introduction to the community, their worldview and relationships to land and waters (Ruwe). The traditional Ngarrindjeri practice of weaving encompasses cultural regeneration and affirmation through the passing on of stories, skills, techniques and environmental custodianship and is one integral aspect of the holistic T&L design approach explored in this project. An underlying core component of the

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1 Unknown to Guattari Arne Naess used the term ‘Ecosophy T’ earlier in his formulation of the Deep Ecology Movement and included three key elements of his understanding of the word ‘deep’ to mean ‘Deep experience’, ‘Deep questioning’, and ‘Deep commitment’, as a way to develop one’s own ecosophy or ecological wisdom. (Harding 2006, 50-51)
project has been the importance of introducing design students to a holistic understanding of the ecological, social and spiritual environment their design propositions will respond to and address. One student’s lasting impression is

The amazing connection and respect that Aboriginal peoples have with [the] planet; understanding the connection between the health of an ecosystem to the availability of materials to the design of an object (2013)

Consequently, we argue that the acknowledgement and understanding of differing worldviews (including Indigenous Knowledges, western ecological thought and contemporary science) combined with an open brief pedagogical approach inspires alternative ideas.

While this may be something of a familiar methodology of any designer’s initial research into the parameters of a “design brief”, a key feature of the program is the exposure to differing worldviews. Moreover, the experience of learning on country and collaborative interaction and discussion with Ngarrindjeri people specifically aims to immerse the students in the tangible world of the community which particularly reinforces the imperative of understanding differing views and ways of knowing. From within a variety of design backgrounds students develop proposals in response to observing and learning on country about community needs and aspirations. After a process of further development these ideas were presented to representatives of the community leadership and Raukkan Community Leader, Clyde Rigney (2013) provided the following thoughtful response.

The Community Council really liked the innovation and thought put into the community landscape from different sets of eyes. Others (some practical men) liked the ideas but talked about the reality of moving from paper to implementation and our lack of resources at this time which was a fair comment. Others captured the importance of dreaming the design into being as being equally important. So the project pieces certainly caused good discussion and will continue to shape our thoughts as we go forward.

It is important to note that the design proposals were not put forward as final solutions, but rather as vehicles for communicating and sharing ideas between cultures of differing world views who can both learn from each other. Proposals ranged from utilizing straw bales, a locally produced product, for low cost, simple technology providing community designed and built temporary structures to the development of art/craft/design summer schools for the sharing of Indigenous knowledges and skills with communities across Australia and internationally. Other projects envisioned community landscaping that would connect the civic centre with the waterfront, architectural systems based on the Indigenous structures of the Ngarrindjeri and a series of books and games aimed at connecting children with the natural heritage of the local environs.

A Critical Ecology of Waste

In thinking about waste and the role of values associated with a critical ecology of waste a number of people and organisations have looked at this from many different perspectives. Some well-known examples are McDonough and Braungart’s Cradle to Cradle: Remaking the Way We Make Things (2008), the more recent ‘The Upcycle: Beyond Sustainability – Designing for Abundance; (2013), Product Cascading: the Zero Emissions Research Institute (ZERI) and Biomimicry by Janine Benyus (2002) to name just a few. In the introduction to ‘The Upcycle (2013, 7) McDonough and Braungart
suggest that in the earlier book *Cradle to Cradle* (2008) ‘Humans don’t have a pollution problem, they have a design problem’ and go on to suggest:

If humans devised products, tools, furniture, homes, factories, and cities more intelligently from the start, they wouldn’t even need to think in terms of waste, contamination or scarcity. Good design would allow for abundance, endless reuse, and pleasure.

While we endorse the idea of effective and sustainable design principles, what can McDonough and Braungart mean when they simply suggest that designers design more intelligently? Although logical, from another standpoint if it is as simple as designing products more intelligently from the start, why are societies continuing to have such problems with these issues? If it is not as simple as they suggest, what solutions might be found in order to be able to deal with the externalities that are all too often the toxic by-products of design solutions?

To be fair, and this is a key point, McDonough and Braungart (2013) also include a range of discussion on the role of Industrialisation and its association with the present modernist market-based economic framework of production and consumption. For example, in utilising a systems perspective, we argue that the existing market-based, capitalist, industrial economic order may be understood as an interconnected mosaic of deeply embedded, taken for granted and often imperceptible structural norms and core values that are now globally influential. Economic growth, consumption, obsolescence, disposable goods, perpetual dissatisfaction, the individualisation of responsibility, and the inevitability of waste are woven into the ideational fabric of contemporary western economic, political and social systems. Arguably then, design, and design education largely continue to be embedded within modernist intellectual and cultural landscapes and values.

These values, informed by, and associated with the present global market-based economic narrative and Enlightenment thought (underpinned by a largely outdated ontology and epistemology) continue to operate subliminally at various levels, and condition learning and practical outcomes for the earth community. Consequently, we contend that the majority of westernised educational institutions are engaged in efforts to provide the knowledges and skills necessary for ‘success’ in an expansionist, market-based, industrial economic order and the broader contemporary global societal milieu in which it is situated. From this position it is apparent that these ideas and values are at least partly responsible for a range of ecologically and socially destructive impacts on the earth community. Furthermore, by introducing design students to appropriate information i.e. an understanding of differing world views, the pedagogical approach provides designers of the future the opportunity to design within an ecology of waste that will not only limit the production of waste as we know it, but will also change our understanding of what waste is. Indeed, one of the most detrimental forms of waste is where there is a lack of understanding and acknowledgement of differing or alternative worldviews which ultimately leads to design propositions that are limited in potential due to outdated and fragmented perceptions.

Given the extent to which contemporary ideas are predicated on the tenets of modernist principles and historically have grown out of a culture of fragmentation, separateness and inequality (Bohm 1980), much of the undeniable evidence of our destructive impacts upon the social and ecological dimensions of the earth community

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2 The earth community encompasses all members of an interconnected earth family - including humans and are subjects who have integrity, intelligence, and intrinsic worth with the right to exist, a safe, clean habitat, and conditions for peace (Adapted from Shiva 2005).
can be seen to be influenced by these explanatory frameworks. Indeed, impacts that we suggest cannot be addressed from within the dominant market-oriented economic logic of continuous growth. Simply put, not only do societies need to find ways to move away from the conditioning and values of the present economistic paradigm, but also develop sustainable ways of being-in-the-world (Heidegger cited in Sharma 2010, 178) that provide substantive opportunities for the continuing development of an ecological consciousness through post-industrial forms of consciousness and positionality. These innovative views of self, perception and knowing provide opportunities for the re-imagining of intersubjective relationships within the wider earth community and ways of being. As Bowers (2011, 125) argues, this cultivates the ‘exercise of ecological intelligence’ whereby a culture’s deep, taken-for-granted assumptions (and values) are examined in terms of whether they are contributing to living within the limits and possibilities of the earth’s ecosystems. (Bowers 2011, 126)

From an Australian Aboriginal perspective Vicki Grieves (2008, 362) identifies comparable ideas, and outlines an Indigenous spirituality that ‘establishes the holistic notion of the interconnectedness of the elements of the earth, the universe, animate and inanimate, whereby people, plants, animals, landforms, and celestial bodies are interrelated’. Grimaldo Rengifo of the Andean Project for Peasant Technologies (PRATEC) in the Andes also argues:

…humans naturally live as beings in a community comprising both humans and the natural world. All are interconnected in a network of relations created and sustained by a process of nurturance through dialogue and participation. Thus, nurturance or mutual nourishment becomes a primary dimension of a living relationship with the natural world. The health of the human community is intimately associated with the health of the whole of nature, and nurturance [peace] is learned through conversation and attentive listening (Rengifo in Nicholls 2006, 78).

In a similar vein, the emerging vision of reality associated with contemporary science is not a world of separate things, but a coherent and integral whole. We should also mention here that this notion of an interconnected whole is not a new idea, and was, and is, well known to shamans, sages and Indigenous peoples as seen through the lens of mystical or religious experience. As Laszlo (2006, 2) also observes, in the mid-to-late twentieth and the early twenty-first centuries, ‘innovative scientists at the frontier of science are rediscovering the integral nature of reality’ (Laszlo 2006; Bohm 1980; Nadeau and Kafatos 1999; Bortofo 2007), and have been able to bring these experiences from the sphere of intuition ‘into the realm of interpersonally verifiable public knowledge’.

These ideas provide an ontological and epistemological basis for the collapse of the divide between the perceived and that which is perceived, the embeddedness of humans in the natural world, and perception as a deeply participatory encounter - an encounter that clearly establishes our connectivity and interaction with all things (Abram 1996). For example, one of the characteristics of connectivity is the amazing coherence of these relationships in multicellular organisms and recent scientific findings.

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3 Ecological consciousness focuses on the realm of perception and the term is used most often in reference to a worldview or belief system in which humans are understood as inextricably linked to the natural world (Grieves 2008; Kwaymullina 2005; Abram 1997).

4 Three key aspects that we see as fundamental to an understanding of ecological intelligence are: The capacity to reason in ecological terms; the perception of the interrelationships between living systems as a sustainable functioning whole; an understanding of our place in that whole and the application of this understanding in our thinking and behaviour. Stevens, Paul. “Ecological Intelligence?”academia.edu. https://www.academia.edu/245376/Ecological_Intelligence accessed February 20, 2015.
demonstrate that communication between the parts and the whole transcends the known limits of time and space (Nadeau and Kafatos 1999). This also indicates the unique correlation between the parts and the whole in living systems which biologist Lynn Margulis has designated as endosymbiosis or ‘symbiosis within’ (Margulis cited in Harding 2006, 165). As Margulis has convincingly demonstrated, evolution is the result of cooperative rather than competitive processes, a perception that may come as a shock to many economic theorists who continue to promote the role of competition in market-based systems as the most natural and effective mean by which to determine the allocation of resources.

Together, these ideas provide an ontological grounding and authentic identification with the natural world for a critical ecology of waste as a perspective for analysis and evaluation. In this formulation we apply the concept of the term critical in the sense that educator Paulo Freire (Grollios 2009) adopts within his critical pedagogy. Thus, educational content should not be separated from social and environmental contexts, or, be disassociated from critical discussion, related to social, political, economic and cultural values. Therefore, an ethic, or system of values from within the wider context of our embeddedness in the social and natural worlds can be seen as motivation for the development of a living eco-consciousness, the adoption and integration of natural processes (designing with nature) and a mindful understanding of the ‘patterns and flows of the natural world’ (Orr 1992, 20). As Pauli (2010) notes in his principles of the Blue Economy, ‘Waste does not exist’ in nature but rather, provides impetus and nourishment for further development within coherent networks of parts and wholes. Nonetheless, changes to the present economic and industrial mindset that offer possibilities for the reconceptualization of waste (Laszlo 2006; Bortoft 2007), will depend on educational processes that nurture and encourage a deeper sense of the already existing connection and obligation to the natural world; An eco-consciousness and design ecology that stems from a love for, and understanding of, the Earth community in all its forms and manifestations.

References


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