

Designing future designers: a propositional framework for teaching sustainability

Learning and Teaching for Sustainability 2014 final report by Yoko Akama, February 2015



This summary report presents the aims that were carried out during the *Learning and Teaching for Sustainability Fellowship*, collated in four sections outlined below:

- 1) Evaluation of 'Design for Change' pilot program with Oxfam Australia
- 2) Literature review of sustainability, design and education
- 3) Share and generate knowledge through workshops with design educators
- 4) Develop alternative frameworks for teaching sustainability in design.

PROPOSED OUTCOMES:

- A report that contains the literature review, workshop outcomes and frameworks for teaching sustainability
- A set of case studies and readings as shareable resource with other design educators
- Communication through the DESIS network to inform design industry, business and future students of the value of design for social change, including a public presentation at RMIT Design Hub.

1) Evaluation of 'Design for Change' pilot program with Oxfam Australia



Design for Change program with students, teachers + Oxfam

The *LTFs Fellowship* builds on a course piloted with final year Communication Design (School of Media and Communication) students in 1st semester 2014. Developed in partnership with Oxfam's *Design for Change* program, students designed communication strategies to engage Australian youth on climate change and food security. The teaching integrated my own research in human-centred design and social innovation, and introduced various design methods to assist student's learning of design's role in addressing complex issues.

The effectiveness of the course in addressing the complex issue of climate change and food security for design was clearly articulated in student, staff and Oxfam's feedback. The quotes below demonstrate the importance of design's contribution to OXFAM and in education, to enable ways to tackle a very complex issue.

'From the start of the course, Oxfam realised that it lacked was the innovative voice of design thinkers. Your projects addressing the complex issue of climate change and its impact on the global food system have challenged Oxfam's thinking on how we communicate with the Australian public on the topic... I can honestly say that your projects have shifted how Oxfam campaigns on climate change. I cannot thank you enough for the innovative and creative thinking that has influenced Oxfam's thinking too.'

Tida Tippapart, Oxfam (personal coms. 8th September 2014)

'[w]hat I got out of this class is simply finding a whole new level of appreciation for people who choose to live with distinct lifestyles. Because of the kind of exposure we got through all the talks, class discussions and site visits I understand why it is people choose to live a certain way, why do people do this and not that etc. Design is such a powerful language and what I loved about Design for Social Change is that it emphasizes this. It influences how people live and it's ultimately us, the designers, who are partly to blame for having the power and the control to alter people's ideas, perceptions and decision making. It's a reminder of why I design ... just so I can change the world in the smallest yet biggest way.'

(Student A)

However, reflecting upon our own teaching practices, several questions arose, which I wanted to explore during the *Fellowship*:

- What disciplinary assumptions and practices are we reinforcing when teaching students to become 'industry-ready'?
- How can we avoid overwhelming the students with complexity and an over-saturation of fear and facts, to balance this with a sense of optimism and potentials that design could seek to address?
- What kind of approach can engage design students to develop an awareness of their own relationship to the spheres they are entangled within?

2) Literature review of sustainability, design and education

A crisis of relationships and designing re-connectedness

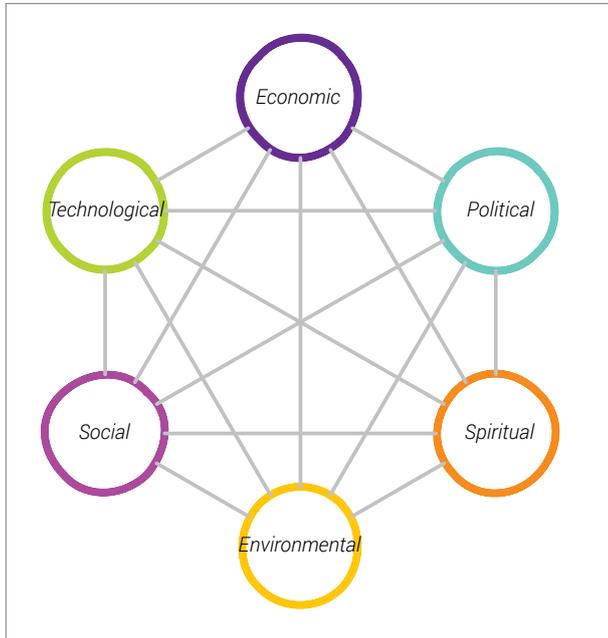


Fig.2.1 The 6 spheres of sustainability

In reading the literature, I became critical of a view that limits sustainability to the environmental sphere alone. 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 resources 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. Following the Brundtland Commission report, attempts have been made in using the triple bottom line framework (e.g. Fiksel, 2009; Fry, 2009; Fuad-Luke, 2009; Margolin, 1998; McDonough & Braungart, 2002; Papaneck, 1995). This framework emerged in the 90s to consider social, economic and environmental dimensions as the three pillars of sustainability (Brundtland 1987; United Nations 1992). However, Perionotto (2012) is critical of the way the triple bottom line ultimately merged sustainability into one a single economic framework. In such instances, environmental and social frameworks were considered as a way to minimise harm and have a return on investment, rather than planning for a positive contribution.

Moving away from the triple bottom line, various other studies propose alternative frameworks, all concerned with broadening and specifying different categories. For example, *Circles of Sustainability* (see Fig 2.2) was developed to expand the triple bottom line. Their proposed framework combine quantitative and qualitative indicators to assess sustainability. Similarly, Partidario and colleagues (2010) articulated qualities such as *material, moral, cultural* together with *landscapes, livelihoods, lifestyles*. Interestingly, emotional dimensions are also included in the framework by Sipos and colleagues in their discussion on 'transformative sustainability learning' that engages the head, hands and heart. 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)' (Sipos et al 2008: 68). Similarly, Walker (2011) adds 'personal meaning' as the fourth ingredient to ensure sustainability is relevant and meaningful to an individual person, preferring this over 'spirituality', which was suggested by Inayatullah (2009).

As a way to consider the various frameworks, I have cohered six spheres – social, political, economic, environmental, technological, and spiritual – as they are continually repeated in literature but in different ways. These are discussed further below. Each of these spheres are interrelated and influence one another, and cannot be isolated or segregated.

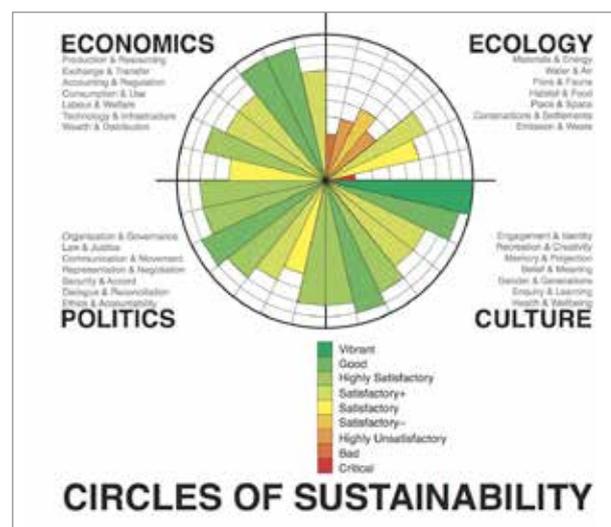


Fig. 2.2 Circles of sustainability: Melbourne 2011 (http://en.wikipedia.org/wiki/Circles_of_Sustainability#mediaviewer/File:Circles_of_Sustainability_image_%28assessment_-_Melbourne_2011%29.jpg)

ENVIRONMENTAL SPHERE

A historical view of design can be seen as a way to control and conquer nature. Indeed, the mark of civilisation, innovation and development has been structures like roads, canals, dams and tunnels that were constructed to increase trade and transportation, which necessarily felled trees, moved earth, extracted resources from nature and changed the course of waters. The Industrial Revolution saw nature as abundant and was there to be exploited, however, the widespread air and water pollution led to shifts in attitudes and subsequent policies during the late 19th century in England.

Today's concern for the environment has emerged in the 60s, for example in the conservationist movement led by Rachel Carson (1963) that highlighted the threat of DDT to wildlife. These concerns led Papanek (1984) to remind designers about biological and ecological insights as important. The 80's brought the first wave of 'green design', which was made prominent by *The Green Design Exhibition* in the UK. This showcased design that was modified as simpler practices to question modern industrial society (Magde, 1997). The 90's saw a second wave with an increase of these environmental applications and transformed its name to 'eco-design'. This brought together influential discourses from the *EcoDesign Foundation* led by Fry and Willis, *The Earth Summit* in Rio de Janeiro, Brazil in 1992 and its *Agenda 21* report became a useful guide for designers (Margolin, 1998). Other designers like Manzini and Cullars (1992) reflected on 'ecological sensibility' for designers to consider in their proposal of material and immaterial artefacts, and Papanek (1995) proposed ethical guidelines for design practices. During this time, *Design for Environment* (DfE) principles began to enter into the supply chain management and new product development for industrial and engineering design developments (Bevilacqua et al, 2012).

Terms like 'sustainable design', 'design for sustainability' and 'design for sustainable development' began to emerge during the 2000's. This decade is characterised by a world-wide concern for climate change so businesses began implementing various measurement models like the triple bottom line, 'cradle to cradle' (McDonough & Braungart, 2002) and Life Cycle Assessment (LCA) to

inform the impacts in emissions from a product's production, use and disposal during its lifetime (Fiksel, 2009). The green 'boom' has led some to coin this as 'a green industrial revolution' (Murray, 2009: 9). Design, being a largely commercial and client-led practice responded to such shifts and began to promote design thinking to achieve incremental and radical innovation (Norman & Verganti, 2014). The three 'r's of Reduce, Reuse and Recycle became en vogue, though its popularity and obscure process of recycling has led some to see it as a way to soothe society's guilty conscience whilst maintaining 'business as usual' (Walker 2011). Upcycling is thus seen to have more impact in enabling obsolete technology and outmoded products to be made anew or re-valued (McDonough & Braungart, 2013). As mentioned in the introduction, design is still largely centred on products. This brief historical overview highlights how sustainability emerged from a concern for the environment where design needed to reduce impact in resources, materiality and waste. However, the following discussion of the other spheres will illuminate how design is also beginning to consider influence in other dimensions.

SOCIAL SPHERE

In general, the social dimension of sustainability makes reference to a condition of social cohesion and equity in access to key services like health, education, transport, housing and recreation (McKenzie, 2004). Social sustainability is seen as a direct response to social injustices and social challenges that must be addressed in order to achieve a sustainable development (WCED, 1987). However, as social values vary from culture to culture, the notion of social sustainability also diversifies. This results in ambiguity, openness and an evolving nature of the term sustainability (Partidario et al, 2010). In fact, all the spheres of sustainability discussed have a social dimension, but the design literature seems to refer to social sustainability when it tries to deal with social issues rather than purely a market-driven objective. The influence by Victor Papanek's *Design for the Real World* (1984) is felt strongly here, where he called on design to move away from market growth and technological innovation, and instead, towards social responsibility and responsive-

ness (DiSalvo et al, 2011; Melles et al, 2011; Morelli, 2007; Thorpe & Gamman, 2011).

Various organisations like the *Young Foundation* and *NESTA* have been pursuing and subsequently popularised the term 'social innovation', and they place the social and commercial endeavours in alliance (Mulgan, 2007; Murray et al, 2010). Partnerships among local businesses, NPOs, governments and communities are seen in such examples where design is used as a tool and approach to coalesce the stakeholders' interests and concerns to enable change they desire. Here, people are not passive end users of outcomes designed by experts, and instead, involved as active participants in a co-creative processes (Akama & Prendiville, 2013; Harder et al, 2013; Manzini, 2010; Sanders & Stappers, 2008). The challenge for designers here is to act as facilitators to make use of 'design devices' for 'infrastructuring' systemic prototypes in collaboration with non-designers for social innovation (Thorpe & Gamman, 2011). This social approach requires the designer to perform 'collective articulation of issues', which means an investigation process into the situation that helps 'to reveal the factors, relations and consequences of an issue.' (DiSalvo et al, 2011:186-187). Among these are approaches such as participatory design (Robertson & Simonsen, 2013) where stakeholders actively participate in the design process; co-design where designers and non-designers collaborate together (Steen, 2013); and similar other terms are often used like co-creation (Sanders & Stappers, 2008), co-production (Jiménez et al, 2013). As such, the outcomes from these initiatives are evaluated, not by a set of technical norms applied by experts and designers, but examining the benefits for the stakeholders and how such improvement might sustain through their on-going participation, adaptation and capacity building, as seen in transformation design discourse (Akama 2014; Sangiorgi 2011).

POLITICAL SPHERE

Design has often been deployed as an effective medium and strategy for forwarding an agenda and to achieve a purposeful outcome. The political in design can be discussed as, for example, who decides, how input and decisions are made, how difference is articulated and

addressed, what is being endorsed or contested, how structures of power are constructed and the impact of design (process, production and outcome) has on other things and beings. As such, the literature places designers as activists, by-standers, mediators, interventionists or promoters of various forms of politics within any given project. In other words, design and designers are integral part of a political system and cannot stand outside of it. Design projects can become sites for concealing or revealing political dynamics, for contesting power, and elucidating values among stakeholders (Agid 2011; Akama 2008), though Suchman (2002) is critical of a stance of 'design from no-where' – common in designers who are ignorant of their own positions within the social relations in which they engage through design.

The involvement and influence of design with its tangible and intangible products incorporated in everyday life is influenced by institutionalised politics and has the agency also to carry out political ideologies (Fry, 2011). Fry argues that design can and should challenge current politics by acting upon unsustainable concerns. This idea reflects interests in critical and speculative design to question the actual realities to conceptually and experimentally propose reflection and possible change for alternative futures (Dunne & Raby, 2013). In a similar vein, Markussen (2013) proposes 'disruptive aesthetics' to define the opportunity for design to raise awareness while connecting with people's emotions, as political potential to intervene in what people do and how they feel, to further question current systems of power and propose alternative. However, Herbert Simon's (1968) famous definition of design is often used when discussing the political role of design for change and action: 'Everyone designs who devises courses of action aimed at changing existing situations, into preferred ones'. Here, design is seen as 'everyday', undertaken by non-designers. This is also another political position in design, different to that which lies in the domain of experts and professionals.

This political role of design has ignited a form of design activism to envision a practice towards positive change (Fuad-Luke, 2009). Julier argues that this becomes a practice that 'reallocates resources, reconfigures systems, and reprioritizes interests... to create alternative constellations of people and artifacts and rearrange the

channels between them' (2013b:145), which is emerging as a movement to challenge neoliberalism (2013a). I similarly see activism and politics strongly nuanced in participatory design (PD), which was conceived in Scandinavian movements towards democratization at work in the 70s, and the belief that those affected by introduction of new technology should have a say in the design process and joint decision-making. Ehn explains that PD 'sided with resource weak stakeholders ... and developed project strategies for their effective and legitimate participation' (2008: 94). PD was never seen as having neutral values, concerned with the ethics of design as an integral part of any intervention. In other words, PD and related fields such as human-centred design, co-design and transformation design has been to politicise strategies for people to become involved in designing, shifting from being merely consulted, to actively 'asked to step up, take the pen in hand, stand in front of the large whiteboard together with fellow colleagues and designers, and participate in drawing and sketching how the work process unfolds as seen from their perspectives' (Robertson & Simonsen 2013:5).

ECONOMICAL SPHERE

The sustainability movement can be seen as a way to counteract the dominance of economic rationalism that only seeks to promote private interests and unlimited growth. As such, the literature often reflects the tension between market-driven design vs. 'socially useful/responsive design' (Thorpe & Gamman, 2011). Pyla (2012: 275) critiques that 'sustainable development's alleged balancing of economics and ecology often assumes the utilitarian and the economic take precedence over the ethical and the cultural'. This seemingly contradictory trend of considering economic 'sustainability' dominance over the other spheres has been a key argument for reform (Kusz, 2013).

In a shift away from dominant, global, centralised economies towards localised, distributed systems of co-production is seen as a way to reduce impact in infrastructure and transportation (eg. food miles, mobility) and also to reconnect residents to community and place (Manzini

& Rizzo, 2011; Meroni, 2007; Morelli, 2011). These localised economic systems are emerging and flourishing due to on-line platforms that facilitate networking, new forms of social engagement and independent economic interaction (Manzini & Rizzo, 2011). This economic landscape includes 'peer-to-peer, disintermediation, wikis, platforms, collaboratives, open sourc[ing], indeed open everything' which is becoming the new lexicon of distributed systems (Murray, 2009: 9).

Following the economic crisis of 2008 that catalysed a decline in trust in governments and banks, citizens became active in finding alternative ways of making a living. This gave rise to the 'sharing economy' or 'collaborative consumption', which is a peer-to-peer exchange where goods and services are rented and used instead of owned (Botsman, 2010). Whilst borrowing or renting has been a conventional practice that helped people avoid buying things or making full use of idle items, it has now become more convenient and distributed, allowing anyone who has a power tool, a car, a spare room or a car park space to make it available for use. Powerful GPS, smart phones and social network platforms allow users to search, see, review, book and recommend, often acting as a broker among individuals, rather than a company. *The aftermath project* (www.aftermathproject.com), gathered by Castells and colleagues (2012), presents a range of such alternative economic practices.

According to *The Economist* (2013), the size and scales of availability and data, supported by models like *Airbnb* (www.airbnb.com.au), *Green Share Car* (www.greensharecar.com.au) and *Neighborgoods* (neighborgoods.net) has flourished over the last few years, resulting in a reduction of costs for the consumer as well as environmental benefits. For example, sharing and renting a car when you need it locally is less resource intense than owning a car and adding another one on the road. Old fashioned bartering systems by-pass any cash exchange, like *Freecycle* (www.freecycle.org) where people donate products and materials they don't need, or *Timebanking* (www.timebanking.com.au), where people's time, skill and knowledge are exchanged. These initiatives are also inspiring international networks like *Design for Social Innovation and Sustainability (DESIS)*. Designers in user-experience,

human computer interaction (HCI), and Computer-supported Co-operative Work (CSCW) are often involved in innovating these technological platforms.

TECHNOLOGICAL SPHERE

Design is often synonymous with technological innovation, which has always been seen as a panacea for solving problems. Leading designers like Richard Buckminster Fuller and Victor Papanek were pioneers of developing pro-technique systems and objects in addressing environmental concerns (Margolin, 1998). However, the increase in electronic waste, planned obsolescence and highly transient digital technology is accelerating product turn-around. These objects are designed to be replaced with newer models, and if we consider design's role in communication, packaging, marketing and branding, it is centrally implicated in propelling this consumer culture in unsustainable ways (Walker 2011).

Instead of developing more technology, there have been trends to optimise the use of materials, leading 'design for disassembly' alternatives to facilitate maintenance, recycle and dematerialisation (Manzini & Vezzoli, 2008). As discussed in the sharing economy earlier, production processes are becoming open and technology more democratic. These are requiring profound changes in 'maker cultures', which include experimental collaborations at *FabLabs* and *Hacker-spaces*, co-creation and p2p production to enable new, personal and autonomous design and production process. Such alternative maker-culture is reconnecting designers with different making skills and a return to practices of craft (Hatch, 2014; Rossi, 2013; Stinchfield et al, 2013). This culture of design is characterised by reflecting and materialising the processes of living with objects and constantly transforming everyday uses, shapes and meanings. Related to the idea of 'thinking through making' (Ingold, 2013), design here not only focuses in the various stages of 'form-giving' (Ingold & Gatt, 2013) but pays equal attention to transformations brought by changes in 'meaning-giving'. Instead of the modernist framework of 'form follows function', Walker (2011) suggests 'form follows meaning' to create scenarios for evolution and endurance. This links in with the next sphere discussed below.

SPIRITUAL SPHERE

The spiritual dimension is not discussed here as a religious framework, but as a form of self-awareness, self-development and a mindfulness that is nurtured in the every-day encounters of the world. It is a turn 'inwards' that reflects, questions current state of being and examines inner process of development. As such, terms like 'growth', 'being' and 'becoming with' (Akama & Prendiville, 2013; Ingold & Gatt, 2013; Jackson, 2009) emerges in this sphere, where sustainability is seen as a learning process instead of an ideal fixed set of goals and outcomes (Tovey, 2009). The spiritual perspective of sustainability as an active everyday awareness and practice has been proposed as the fourth pillar in addition to the triple bottom line and considers personal ways of finding meanings to life (Inayatullah 2009; Walker, 2013). The permaculture movement and teaching is a strong influence of this sphere. They place ethics at the heart of practice where health and spiritual well-being are included in their seven spheres. 'The ethics earth care, people care and fair share form the foundation for permaculture design...' (Telford, n.d.). These ethical principles are then enacted through seven domains beginning from the individual level working outwards to the global level (see fig.4.3).



Fig.4.3 The seven domains of permaculture action (Telford, n.d. b)

Calvelli (2009) describes a need for curiosity and a critical questioning of oneself in response to temporal contexts (past, present, future) and extending that awareness to stages of creative thinking and imagining. He sees this as being important to consider what design is attempting to 'improve', whether it is utopianism, idealism or transformation towards something, and to keep in mind possible adverse consequences.

The spiritual sphere also recognises the inherent connection beyond the individual and personal that is entangled with other dimensions of time, place, geography and society. The collaborative and entangled nature of this critical awakening and awareness is key to minimise risks of this approach becoming 'overly self-reflexive and introverted, sustained, practiced, and exchanged in a closed community' (Malpass, 2013: 334). Others have discussed the spiritual dimension as a search for ways to inspire more sustainable practices and ways of being (Haigh, 2010; Varadarajan, 2010). Zen philosophy has also been incorporated by some design scholars as an attempt to integrate Eastern and Western notions of design (Akama 2012; 2014), where the spiritual dimension seeks to collapse distinctions between self-other, object-subject, human-non-human, time-space, bringing a sensitivity towards between-ness and plurality of being and becoming.

3) Broken relationships in design education



Presentation at workshop

Industry-based professions like graphic, industrial, fashion, architecture and landscape design often emphasises technical knowledge and reinforces specialisation as a way to demonstrate expertise (Giard & Schneiderman, 2013). One major critique made here is how sustainability has been added on to become a specialisation in design, reflected in terms like 'eco-design' or 'design for sustainability'. This means that the status quo of business growth, marketing and novel aesthetics is maintained, perpetuating a cycle of rapid consumption and obsolescence in existing industry practice (Walker, 2011). In this view, sustainability is largely framed in a product-centred way by minimising resources, energy and waste or incorporating renewable technology, and though well-intended, it further disentangles the web of spheres discussed in the last section.

The literature review examined the integration of sustainability in design education and revealed that, although this integration started more than a decade ago, it is still incomplete and limited to specific spheres of sustainability. Studies undertaken and published in the mid-2000s by Ramirez (2006, 2007) and in 2013 by Giard & Schneiderman evidences a gap between institutional and theoretical understandings of sustainability and the way in which sustainability is articulated to learning and teaching activities. While universities and teachers have adopted definitions of sustainability based on the *Triple Bottom Line* approach, it was evident that design courses have only addressed the environmental "problems" where students are asked to design "solutions" based on indus-

trialisation paradigms and developed through traditional design methods.

Of more concern for Learning and Teaching in design is an approach in education that seeks to make students 'industry ready', which can reinforce such industry practices. This is reflected in how briefs are considered, often relying upon a linear Problem Based Learning (PBL) model and developed through studio-based courses that try to imitate situations that students are supposed to face as industry professionals (Roberts, 2004). This section further elaborates this from the accounts that were shared by design educators and our own critical reflection of the class that we taught, highlighting the need to question and redesign paradigms of design if we were to progress forward.

Yet, there is also an emerging discourse that acknowledges the need for design to be entangled in a 'wickedness' of concerns, which is seen in movements in transdisciplinary design, transformation design, participatory design and design for social innovation (Burry, 2013; Manzini, 2010; Sanders & Stappers, 2008; Sangiorgi, 2010; Steiner & Posch, 2006). The discussion here suggests that a 'wicked problem' requires various stakeholders, beyond designers, to collectively draw on their local, situated knowledge (Parker & Parker 2007) whilst breaking out of the narrow 'problem-solving' mould that characterize much community change work (Darwin 2010). Interestingly, design here has pursued a methodological approach, not to deliver an end result – either a piece of technology or interactions among people – but to pursue how various stakeholders can work together to co-design an action platform that can enable a multiplicity of interactions possible within the complex dynamic of the real world (Manzini, 2011). These concerns, notions and frameworks have been central to developing a framework of 'designing re-connectedness' to assist in design education.

The workshop "Teaching Approaches to Sustainability", conducted as part of the *Fellowship*, indicated similar patterns observed in literature. The workshop invited participation of several educators from key universities who are known for quality design education, including Monash, Melbourne, Swinburne and RMIT University. They

were invited on the basis that they teach theoretical and practical courses related to sustainability. Participants shared what they considered as important approaches to teaching sustainability and three methods/resources/activities that they used as part of their practices. It is important to note that all the participants displayed a strong interest towards sustainability and this was their personal commitment was the key reason for bringing sustainability into design education rather than an institutional or curriculum obligation.

All the participants demonstrated an understanding of sustainability based on the *Triple Bottom Line* approach, and in most examples, further included technological, political and spiritual dimensions of sustainability. This holistic approach to sustainability is especially visible when participants explained the *background* and *agendas* of the design exercises as well as in the analytical and theoretical *fields* they used to frame and introduce the course. However, I discovered that the practical development of these exercises often had an environmental focus that emphasised a technological outcome. Even though other spheres of sustainability were clearly articulated within the learning and teaching activities, those spheres seemed to be subsumed under environmental and technological dimensions.

This discovery seems to indicate a deeper and endemic problem with design – such as industrial or graphic design – that is still wedded to the conception and processes of industrialisation. Placing this in the context of the history of design, the industrialization process, mass production and consumption, and the specialization within a field was created as an attempt to solve problems from singular perspectives and make this an efficient process. As such, design education in literature and practitioner's accounts seems to emphasise the development of expertise in specialized fields of technical knowledge and practice. This has resulted in silos of mastery and expertise, further adding to the issue of viewing the six spheres of sustainability as separate. Furthermore, traditional paradigm of design developed during the 70s suggested a logical process that sequentially went from problem to solution. Practice and methodology was developed on this model, which suited design of objects as a solution to a definite problem. This reveals

the inherent tension in design education where aims to create industry-ready graduates is being outweighed by the concerns for thinking how design can address the six spheres holistically.

For example, the *Double Diamond* diagram (fig 3.1) is widely used to make convincing arguments about design to other fields (especially in business) because its abstraction gives a perception of certainty and a logical understanding of a design process. Other models like IDEO's *Human-centred Design Process*, Stanford University d.school's user-centred prototype-driven design process, *Stanford Design Innovation Process* and *Rotman's 3 Gears of Business design* are all variations of a similar process of expansion and narrowing to produce an 'appropriate solution'. Tan (2008) describes how these diagrams are often about providing an insight on the design process to the outsider. What happens inside these abstracted, meta processes is rarely revealed and harder to describe. The more interesting question might be around what guiding principles might aid designers to think 'holistically' or to acknowledge and maintain awareness of the spheres and scales of a design intervention.

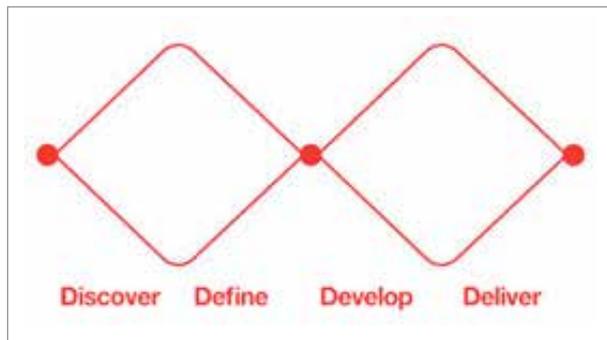


Fig 3.1 Design Council, double diamond diagram

These tensions were also evident in the outcomes that students were asked to present as result of their learning. Often, these outcomes manifested as artefacts conceptualised as commercial products or services. This was less emphasised in the *Design for Social change* course, where student were encouraged to consider political, social and spiritual spheres, yet arguably, not all six spheres were considered in the teaching of this course.

Further findings from the workshop were the reflexive approach implemented by participants when teaching sustainability. As mentioned above, all the participants

in the workshop displayed personal interest for sustainability as part of their teaching activities. This suggests that at some point in their careers they have questioned traditional paradigms of design and have incorporated sustainability as a personal and professional responsibility. This reflexive approach was integrated in their teaching for students to undertake as well. In one way or another, most of participants encouraged students to develop their own personal approach to sustainability based on their own experiences as individuals. Reflexivity is integrated into design education through theoretical (e.g. annotated bibliographies), design exercises (e.g. studio projects) and reflective assessment tasks where students are asked to construct their own questions towards sustainability and develop their own answers, rather than following a predefined design brief.

4) Designing re-connecteness: a propositional framework for teaching sustainability

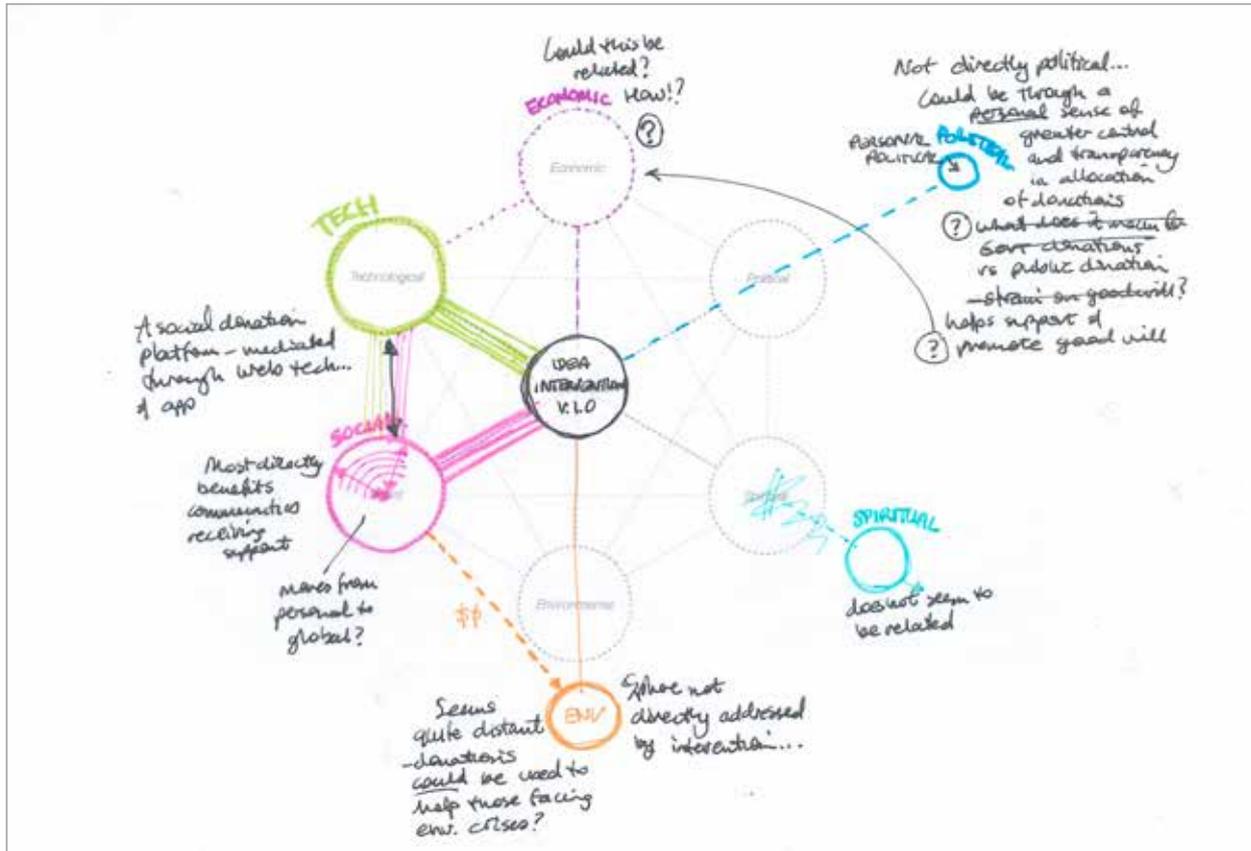


Fig.4.1 Six-spheres reflection map

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. However, in an attempt to prevent students from being overwhelmed by the 'wicked' complexity and an over-saturation of fear and facts, I extend Buchanan's notion of *placements* (1992) as a way to initially position the student-designer's entry points into a 'wicked problem'. This is a visual method [Fig.4.1] developed through this *LTFS Fellowship* that attempts to keep all six spheres entangled in sustainability in view, whilst locating the intervention proposed by students as a working hypothesis for exploration and development. The 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.

This framework incorporates the findings from the literature review and knowledge shared by teachers in design. Furthermore, it addresses several other concerns outlined in *The American Institute of Graphic Arts (AIGA, 2009) Designer of 2015 Trends* and the *UK's Royal Society of the Arts (Parker, 2009)*. These outline the challenges for educators and students to build upon. It includes the ability to work in interdisciplinary contexts and draw upon information from diverse fields of expertise; to 'find', as well as 'solve' problems, by recognizing that problems are nested within more complex issues; and to practice ethically, empathetically and sensitively within a range of socio-cultural and environmental contexts.

I propose the importance of building capacity in students-as-future-designers to help them ask critical questions towards locating their own possible points of design intervention among the sphere of interconnectedness. Fig.4.1 is seen as a way to scaffold this process. This reflexive approach necessitates that students begin by consciously designing themselves, where design be-

comes an inward movement of change rather than an external one of changing systems, products or behaviours. I suggest that a classroom can be a safe-yet-challenging environment to scaffold ways for students to start interventions they make to themselves and their everyday practices. In parallel, the reflexive approach also demands the design educators to address their own assumptions of design where again, starting with an inward movement of change rather than towards an external application in curriculum or student-centred learning. A prominent environmental educator, David Orr (1991, para. 23) warns that education is not simply a matter of filling the students' minds with '...facts, techniques, methods and information...'. He suggests a principle that '...comes from the Greek concept of *paideia*. The goal of education is not mastery of subject matter, but of one's person. Subject matter is simply the tool.'

The report concludes with the implications of this study, which include questions and recommendation for further exploration in *Learning and Teaching for Sustainability*. Some suggestions include the need to investigate alternative pedagogical methods in design beyond what this study researched, examining a broader sample of educator's approaches as well as their institutional frameworks that guides their teaching. This may necessitate re-visiting the way sustainability is framed and addressed in RMIT's *Sustainability Action Plan* and guidelines for L&T, both of which focuses on environmental spheres or Triple Bottom Line, and overlook the other spheres proposed in this report. The workshop method that was piloted among design educators during the *LTfS Fellowship* could be further developed as a productive means to scaffold ways to discuss, exchange and mutually learn how the six spheres of sustainability can be integrated into pedagogy.

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