

14. Sustainability, Living Labs and Repair

Approaches to Climate Change Mitigation

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The year 2020 started with a massive bushfire crisis in south eastern Australia, resulting in disruption to many communities, the loss of lives and businesses, an estimated loss of a billion animals and the dirtiest air on the planet in the cities of Sydney, Newcastle and Canberra. With record-high temperatures and a punishing drought lasting several years, the Australian bush was primed to explode into flames. With lightning strikes in national parks, the spontaneous eruptions of bushfire spread from the north coast to the south and inland towards the alpine regions of New South Wales and Victoria. With the very hot year of 2019 affecting other parts of the planet in 2020, the Antarctic Peninsula reached a record 65 degrees Fahrenheit. The chapter that follows reflects the new progressive politics of climate change that emerged in 2019 with large mass demonstrations taking place in Australia and around the world and examines the critical role of universities in the mitigation of climate catastrophe. The following interventions are variably focused on the concept of 'Living Labs' where thinking is developed within a problem-solving ethos. The three contributions here offer ways to think about sustainability

with specific reference to waste recovery, environmental awareness in urban settings and the contribution that a ‘repair’ mentality can make to a shared and re-cycled economy. With a clear-eyed recommendation that mitigation of climate change starts locally, the premise of the paper is that people can work with what is available as local solutions to specific problems. The impact of this approach can be essential to people who sense the impending catastrophe and who may have experienced the crisis directly through compromises in their health outcomes, the experience of trauma and the loss of property and livelihoods, though through no fault of their own. The links through the Western Sydney University campus, common ground to the authors to both its small bushland outpost and further to the local community it serves, suggest that the boundaries of the campus are permeable—and that *Living Labs* are both a means and metaphor for thinking about how the campus opens learning and knowledge creation about sustainability for its students, staff and community constituents.

Introduction

The following collaboratively-written chapter emerged out of our panel for the *Around the World* online conference on the theme of environmental sustainability. We would like to contextualize our contribution with reference to our country of residence, Australia, and our academic work on the campuses of Western Sydney University (WSU). The university is located on never ceded Aboriginal land. We therefore acknowledge the *Dharug* and *Gandangara* peoples as the traditional owners and custodians of the lands on which our particular WSU campus is sited. We respect their ongoing cultural and spiritual connections to this country.

Our chapter is motivated by the thinking and activities that coalesce around the specific theme of environmental sustainability. We see this theme as the most critical long-term contemporary concern of our shared world. The most recent IPCC report gives the planet half a generation to make wide-spread transitions across society, if we

have any hope of limiting global warming to 1.5 degrees above pre-industrial levels.¹ Universities have an important role in tackling these transitions as stewards of lifelong learning and incubators of innovation. Our university supports the case that the resilience of its constituent region will be achieved by responding to local environmental and societal challenges across all elements of its core business: curriculum, operations, research and engagement.

In broad terms, we can break down the climate change crisis into problems and practices related to:

1. The context of human-induced climate change and global warming and the concomitant need for transitions across society and culture.
2. The need for our university to focus on its own region and to contribute to sustainable practices related to both water and land in broadly promoting livability.
3. The need for our university to support the transition to circular and share economies by championing new skills and practices and applying them to specific contexts with defined goals and outcomes.

No potential approach to the mitigation of climate change should be ruled out. Thinking our way out of this dilemma requires both a renewed sense of moral clarity and a move to a more profound way of thinking about the planet. In psychological terms, this is thought of as equivalent to a therapeutic recovery (for example, from addiction), in theological terms as equivalent to a religious conversion and in evolutionary terms to the survival of both human and non-human species.

According to Charles Taylor,² the eighteenth-century Enlightenment deemed the natural world, everyday life and the life of the mind as the key sources of human identity and self-formation. With climate change, what passed earlier for the essentials in the formation of a modern identity are now considered under threat. This chapter thinks about how to recover these essential elements for a twenty-first-century

1 IPCC, *Global Warming at 1.5° Celsius: Summary for Policy Makers* (Geneva: IPCC, 2018), report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

2 Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge: Harvard University Press, 1989), <https://doi.org/10.1177/004057369104800210>.

Enlightenment by addressing the concerns and impacts of climate change.

With the focus on environmental sustainability, a key research priority for this university is to reflect on the contexts of the campuses themselves: their facilities, their uses, the sources of energy and how research that its staff undertakes can address these aspects of university life.

There are troubling signs that climate change is ramping up extreme impacts in Australia, one of the most marginal countries in the world with respect to cyclical extreme weather events such as drought and flood. We believe we can now distinguish between weather and climate in the Australian context given the recent evidence of the hottest years on record (eight of the last ten—see Fig. 1). In 2019, there has been an unprecedented rain event and flood in Townsville and north-western Queensland. The fish kills on the Murray Darling River system have resulted by the mismanagement of scarce water resources exacerbated by a regional drought lasting eight years.

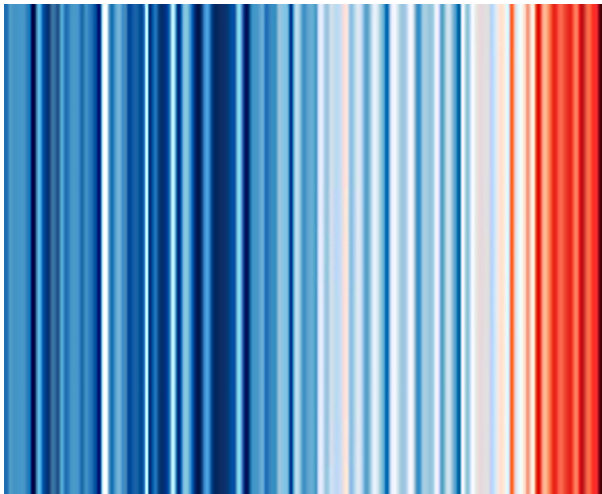


Fig 1. Prof Ed Hawkins warming stripes climate change visualizations of the world's average temperatures from 1850–2017.³

The fish kills are also a reminder of other threats to animal species through habitat destruction such as that experienced when fires raged

3 Ed Hawkins, 'Warming stripes' (May 22, 2018), <http://www.climate-lab-book.ac.uk/2018/warming-stripes/>.

in the high country of Australia. It is possible the demise of particular animal species as a consequence of more frequent fire events is tied to climate change. With these kinds of considerations, we have to think more deeply about the impact and effects of climate change. For example, in our area of the globe (southern hemisphere) the impact of climate change on Antarctica—particularly West Antarctica—is evidenced by ice melts into the sea. The effect of rising sea levels creates a crisis in our region with respect to habitability of low lying island nations and atolls in the Pacific. With a recently discovered ‘cavern’ below the land surface in Antarctica, the speed with which the ice melt is occurring appears to be accelerating.

The Australian bushfires of 2019–2020 were unprecedented in scope, scale, with costs in the loss of human life, livelihoods, dwellings, livestock and native animals. Centred largely on the east coast and parts of the inland, the bushfires burnt through an enormous amount of bushland—national parks, commonwealth estates and privately owned land. Now, the COVID-19 pandemic, coming on the heels of the fire catastrophe, has driven a deeper sense of crisis in the lives of those who had survived the fires but who were damaged emotionally and financially. We cannot but acknowledge the needs of those in the midst of this pandemic who, only weeks before the pandemic emerged, were struggling to find the resilience to recover from the worst bushfires known in Australia and indeed the world.

Despite Australia being precariously placed at the forefront of very serious climate challenges, it also has some excellent advantages. Australia has near-ideal conditions to enable access to non-fossil fuel sources for energy generation. The exponential take-up of rooftop solar as well as the development of solar farms on an industrial scale suggest an alternative scenario for energy generation. Given the inability of successive Australian governments to act on climate change, the stakes are high for politicians attempting to move toward stronger policy settings so that Australia might reduce its carbon footprint and deploy clean energy possibilities. Even with relatively small-scale undertakings such as the Carbon Pollution Reduction Scheme in which businesses can sell carbon credits, there is a long way to go towards neutralizing Australia’s carbon footprint. Coupled with government incentives for both rooftop solar and solar farm investment and a recent court ruling

that defeated the proposal for a new coal-fired power station, there are signs that change may be underway. The explosion of school-age children around the world engaging in climate change demonstrations (including Australian schools) is also a welcome sight where the point about generational impact is clearly made.

Our chapter is driven by the particular projects that WSU academics on the *Around the World* panel have recently developed. In the context of the university, our panel explores some of the alternative ways that environmental sustainability can be actioned. The chapter is in three parts and each part is linked by both an interest in activism as a mode of addressing the climate change crisis and as a manner of offering practical approaches to engaging with these concerns.

Part 1 of the chapter is by Associate Professor Abby Mellick Lopes and Professor Jonathon Allen, setting the scene for how universities can contribute proactively to the societal transitions that need to take place. They argue that sustainability is agenda-setting for universities, and call for a different disposition in relation to how universities enact and facilitate knowledge creation. Abby and Jonathon spotlight three project examples that give shape to this new disposition, which have occurred over the last decade: *FuturesWest 2031*, *Transitioning to Sustainable Sanitation Futures* and the *Transdisciplinary Living Lab* (TDLL). These examples demonstrate the value of a future focus in learning and teaching, the importance of providing a space of experimentation where failure is seen as an essential part of learning enterprise, and the centrality of collaboration, which breaks down division between disciplines and the competitive relationship between universities.

Part 2 of the chapter is by Maryella Hatfield, who extends the Living Lab concept by focusing on the role of storytelling in communicating, ideating and inspiring sustainability. This includes documentation of some of the cross-disciplinary processes underway on campus among staff, students and external stakeholders. In a specific example, Maryella describes the impact of discovering bush land on our campus including a creek—a small tributary of the Parramatta River, a project that commenced with an investigation of this bushland and water with the involvement of media production students in a process of interviewing experts about the area. Uncovering these environments on campus

and then working on their role in the mix of initiatives to sustainability provides a great opportunity for context-led and problem-based learning experiences.

Part 3 of the chapter is by Dr Alison Gill, Associate Professor Abby Mellick Lopes and Ms Francesca Sidoti. Alison and Abby have been researching opportunities to repair everyday things that could be put on an alternative life path to an end in landfill, and to share design strategies of reuse, remake, maintenance and repair critical to sustainability, rather than promoting new objects. Recently it has become more urgent to reframe the role of repair as part of a community response to a waste crisis, as local councils struggle to cope with new responsibilities—material, socio-cultural, educational—in light of China’s precipitous withdrawal from its role as the world’s global recycler. Following an initial survey by Francesca of repair businesses and initiatives in the City of Parramatta, the community of interest to the university, the ‘Re-pair’ project turns to how the university could champion specific learning and cultural practices of sustainability with the potential to connect communities to more resilient futures with materials and reparative skills. This section of the article will outline a few key findings from the survey of local enterprises, and particularly the aspirations and challenges in transitioning from linear take-make-use-waste to closed loop and share economies.

These three projects are not mutually exclusive in either the thinking that drives them or the knowledge interests that guide them. The links through the university campus to both its small bushland outpost and further to the local community it serves suggest that the boundaries of the campus are permeable—and that *Living Labs* are both a means and metaphor for thinking about how the campus opens learning and knowledge creation about sustainability for its students, staff and community constituents.

A Decade of Design-led Sustainability Projects at Western Sydney

Abby Mellick Lopes and Jonathon Allen

The Living Lab concept—collaborative learning in a living, social setting—has its roots in the experiential, problem-focused approach to learning championed by John Dewey in the early years of the twentieth century.⁴ His key claim of a continuity between learning and society has underpinned recent developments in Living Labs, engaged research, ‘work-integrated learning’ and the development of a research and teaching nexus. These developments attempt to roll back the abstraction of knowledge in academic institutions, to enhance the contemporary relevance of knowledge in applied contexts.

The critical and all-encompassing concerns of sustainability underscored by the Sustainable Development Goals (SDGs) and their associated 169 targets, to which Western Sydney University became a signatory in 2017,⁵ bring a new urgency to these developments. However, rather than making education more socially relevant, there is now an unprecedented need for learning to be brought back to society, at multiple scales—local, societal and global. As Ezio Manzini, design theorist and champion of the social role of the design school in the transition to sustainability, remarks:

The transition toward sustainability is a massive social learning process. The radical nature of the objective (learning to live better while leaving a light ecological footprint) requires vast experimentation, a vast capacity for listening and an immense degree of flexibility in order to change. Sustainability and the conservation and regeneration of environmental and social capital means breaking with the currently dominant models of living, production, and consumption, and experimenting with new ones. A social learning process on this vast scale must involve everybody.⁶

4 John Dewey, *Experience and Education, The Kappa Delta Pi Lecture Series* (New York: Touchstone, 1997).

5 Western Sydney University, ‘Sustainable development goals 2030’ (2017), https://www.westernsydney.edu.au/learning_futures/home/learning_transformations/re_developing_new_curriculum_courses/education_for_sustainability/sustainable_development_goals_2030

6 Ezio Manzini, ‘Design context: Enabling solutions for sustainable urban everyday life’, in *Enabling Solutions for Sustainable Living: A Workshop*, ed. by Ezio Manzini,

The role of the university in this social learning process is critical. The university is a repository of knowledge and memory, held both by people and in the durable records of knowledge created over time. The pursuit of new knowledge is a key concern of the university, which lends to it a unique, experimental disposition in the culture, and a capacity to facilitate the massive social learning process demanded by sustainability.

Leading design thinker Tony Fry has commented that as Australian universities took on a functional role in relation to the economy with the introduction of the Higher Education Contribution Scheme (HECS) in the late 1980s, learning was replaced by a culture of earning. We see evidence of this in the language of mainstream public discourse, where universities are primarily understood as service-providers to the labour market. The precarity evoked by the current COVID-19 crisis, has caused universities to double down on their efforts to market their offerings. However, contrary to negative, narrowly-formed economic views about the relevance of the university, the context of the crisis tells us that the university has never been more relevant. Universities must turn toward sustainability in their efforts to ‘create the knowledge necessary to support a world that is livable for humanity’.⁷

In what follows, we provide some evidence for these claims of the relevance and importance of the role of the university by spotlighting three design-led sustainability projects conducted within Western Sydney University, and in partnership with other universities in the last decade. In selecting these few examples, we are in no way suggesting they are the only sustainability projects of note that have or are occurring at the university.⁸ Instead, we highlight those projects that were particularly design-led, and that showcase an affinity between design and the social learning process advocated by Manzini amongst others.

The first project is *FuturesWest 2031*, a design-led initiative that aimed to generate a conversation about how Western Sydney could adapt to a

Stuart Walker and Barry Wylant (Calgary: University of Calgary Press, 2008), pp. 1–24 (p. 16), <https://doi.org/10.2307/j.ctv6gqw0z.5>.

7 Tony Fry, ‘Confronting the Humanist Question’, *The Australian Higher Education Supplement* (January 31, 2007), p. 26.

8 To get a sense of some of the many Living Lab projects that have occurred or are currently underway at Western Sydney, see https://www.westernsydney.edu.au/driving_sustainability/sustainable_futures/living_labs.

climate-changed future, which was held at the University of Western Sydney (now Western Sydney University) in the winter of 2009.⁹ At this time, there was vital sustainability research going on at the university in various disciplines, however there wasn't the social license or cultural imperative that exists now, and the cross-university conversation was only in its early stages. We can recall there were still debates about the reality of human-induced climate change going on in the classroom and also on occasion in the staff room! *FuturesWest 2031* attempted to think about sustainability transitions for Western Sydney using an approach called 'design futuring',¹⁰ which was also being championed in the design classroom via hybrid methods of future scenario planning.¹¹

The project involved substantial baseline research on pressure points facing the region such as the future of food, urban mobility and population expansion. It used trends analysis and educated speculations about how these converging challenges might be met to develop scenarios of sustainable futures. This process was led by Dr Tony Fry in a 'hot house' workshop involving academics, students and local stakeholders. Graphic design was used to visually communicate emerging ideas in a community workshop promoting themes for ongoing conversation, examples of which are presented below in relation to two of the key themes explored at the event: the Western Sydney Food Bowl and Co-Housing.

FuturesWest 2031 was a catalyst for transdisciplinary conversations around sustainability, and had a strong influence on the project-based curriculum in design which continues to this day. In the above example, redundant car parks (on the presumption that by 2031, we've transitioned away from personal cars using internal combustion engines, to a greater dependence on public transport) are seen in three stages of their transition to urban agricultural and aquacultural food precincts—a zero-kilometer café appearing in the last image of the sequence.

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- 9 Jonathon Allen, Abby Mellick Lopes and Tara Andrews, 'Futures west: A design research initiative promoting sustainable futures for Western Sydney', *Cumulus 38° South 2009 Conference* (Melbourne: Swinburne University of Technology/RMIT University, November 12–14, 2009).
 - 10 Tony Fry, *Design Futuring: Sustainability, Ethics and New Practice* (New York: Berg, 2009), <https://doi.org/10.2752/204191211x12980384100355>.
 - 11 Abby Mellick Lopes, Stephen Clune and Tara Andrews, 'Future scenario planning as a tool for sustainable design education and innovation', *Connected 2007: International Conference on Design Education* (University of New South Wales, Sydney, July 9–12, 2007), <https://doi.org/10.1016/j.destud.2011.08.005>.



Fig. 2 A future imagined: a car park becomes a site for local food production.
Image credit: Jonathon Allen/ Paul Kouppas, *FuturesWest 2031*, 2009.

The role here of visualizing potential futures in the context of this project was twofold: firstly, to explore options that were hitherto unthought of, and secondly to provide seductive visions of the future in order to engage stakeholders and to generate, hopefully, provocative conversations with those stakeholders. An image is powerful in that it has the ability to focus discussion and ensure there is a consensus of understanding, whereas ideas and futures presented solely in written form are typically more open to interpretation. The image evokes the change as a ‘concrete hypothesis’: ‘Not yet a reality, but that could be made real if the necessary moves were made’.¹² Visualizing potential futures allows deeper, detailed discussion as, whilst stakeholders may have different opinions and priorities, they are at least focused on the same point at hand rather than upon their own, often differing, interpretive visions.

The Food Bowl theme recognized that while the region has an agricultural history, much viable agricultural land had been claimed by suburban sprawl and industry in recent decades. With growing concerns about food security and the decline of manufacturing and jobs in the West, an opportunity was framed to revisit this agricultural legacy and think about urban food in new ways for the region. This theme recognized the extensive expertise in water, soil and food sustainability

¹² Manzini (2008), p. 26.

at the university, and a promising cultural momentum around urban agriculture.



Fig. 3 A future imagined: a 'McMansion' becomes a co-housing retrofit and hot tarmac is de-paved to make way for food gardens. Image credit: Jonathon Allen/ Paul Kouppas, *FuturesWest 2031*, 2009.¹³

The co-housing theme addressed the momentum of poor housing development in Western Sydney, drawing attention to the car-dependency implicated by its diverse geography and inadequate public transport infrastructure, and built into the fabric of the buildings, as can be seen in the expansive space given over to the car in the image at left above. Building on the Food Bowl observations, the co-housing theme attempted to think through how Western Sydney might 'receive' a future population of migrants including climate refugees from nearby countries, facilitating greater density and a more climate-appropriate future everyday life.

In addition to raising questions about better climate-defensive and passive-thermal built forms, this theme brought into the conversation the importance of *social* innovations. For example, platforms, tools and 'starter packs' could support the take up practices such as food gardening. Equally, opportunities for new settlers to express and share culturally-specific knowledge and expertise, need to be created and expanded. Reciprocal and regenerative learning cycles are a critical

¹³ The 'McMansion' is a reference to the fashion for excessively large dwellings that tend to parade codes of affluence whilst often being cheaply constructed and expensive to run.

aspect of the wider social learning process that *FuturesWest 2031* aspired to initiate. Rather than technical solutions or fixed realities, the visual scenarios we presented were meant to function in an innovative way as propositions and conversation starters. As it turned out, the conversation we were attempting to start with stakeholders was probably a little ahead of its time. The event was, however, a significant learning exercise for everyone involved, and provided an experience of the university in the role of facilitator of social learning for sustainability, and as a hub for facilitating sustainability transitions.¹⁴

The second example was a research partnership led by the Institute for Sustainable Futures (ISF) at University of Technology, Sydney (UTS) in collaboration with Western Sydney University (WSU), called *Transitioning to Sustainable Sanitation Futures*, and also known as The Funny Dunny Project¹⁵ (2010–2011). This project established a transdisciplinary community of practice, involving academics from three universities, a water utility, industry and local government partners all working together to explore the problems and opportunities involved in implementing a novel system of sanitation across the two universities. This was very much conceived as a social learning initiative from the outset, creating a space to encounter and explore the many ‘unknown unknowns’ likely to emerge in the process.¹⁶

Taking the multi-level perspective promoted by transition management theory to understand changing socio-technical systems,¹⁷ the global decline in the quality of mined phosphate rock used for food production¹⁸ can be understood as a ‘macro-level’ or landscape event, outside the realm of direct human experience. The polluting and aging waterborne sanitation system in Sydney exists at the ‘meso’ (or regime)

14 Allen, Lopes and Andrews (2009).

15 ‘Dunny’ is Australian slang for toilet.

16 Here we reference Donald Rumsfeld’s well-known observation about the ‘knowns’ that ‘we don’t know we don’t know’, which was made during a Pentagon news briefing to frame risk in relation to defending the US war in Iraq. Sustainability research and practice demands that we embrace risk in pursuit of a just and liveable world.

17 Frank, W Geels, ‘Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case study’, *Research Policy*, 31.8–9 (2002), 1257–1274, [https://doi.org/10.1016/s0048-7333\(02\)00062-8](https://doi.org/10.1016/s0048-7333(02)00062-8).

18 Dana Cordell, Jan-Olof Drangerta and Stuart White, ‘The story of phosphorus: Global food security and food for thought’, *Global Environmental Change*, 19.2 (2007), 292–305.

level,¹⁹ to which everyday system ‘actors’ have some access. This project sought to create a ‘micro’ version of a complete ‘closed loop’ alternative system, make it operational and learn from what transpired from technical, social, legal and environmental perspectives. The system involved the installation of a number of urine-diverting toilets on campus at UTS for use by members of the campus community, the collection, storage and transportation of collected urine to Western Sydney, and its reuse as a partial substitute for phosphorus fertilizer in plant pot trials within the Agriculture Department at WSU, Hawkesbury.

One of the most unique aspects of this project was the way it positioned the importance of visual communication design in facilitating system operation.²⁰ Previous research had shown that a highly technical approach to the problem of recovering and reusing urine had excluded the experience of everyday toilet users, undermining the new system’s chances, as the success of every new technology depends on its socialization. The Funny Dunny Project gave the user a central role, inviting, via visual communication tools created by students in the design programs of both university partners, a chance to participate in the learning process.



Fig. 4 A graffiti board designed to collect data for the Funny Dunny Project helped the researchers to track the socialization of the new ‘closed loop’ sanitation system. Designed by Yana Mokmargana (student of Visual Communications, WSU).

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- 19 Dena Fam et al., ‘An historical analysis of Sydney’s sewer systems to determine windows of opportunity for system change’, *Design Philosophy Papers*, 7.3 (2009), 195–208.
- 20 Abby Mellick Lopes, Dena Fam and Jennifer Williams, ‘Designing sustainable sanitation: involving design in innovative, transdisciplinary research’, *Design Studies*, 33.3 (2012), 298–317, <https://doi.org/10.1016/j.destud.2011.08.005>.

The Funny Dunny Project was conceived as a trial of a radical innovation at a 'niche' level, with the university acting as a critical research space to explore what was effectively a complex and future focused sociotechnical experiment. The 'niche' framing is interesting because it positioned the experiment ahead of what is actually happening in the culture at large—in what Frank Geels calls a space for radical innovations, where experiments are 'protected' and for which markets and preferences do not yet exist.²¹ The project modelled system change by involving those with a vested interest in sanitation and a desire to explore the potential for change, but with the cautious conservatism that characterizes risk-averse industry 'actors'. It is critical to note here that the way the university setting acts to protect and nurture innovation and enshrines the 'right to fail' as an important component of social learning.²²

While this experiment created more research questions than it answered and there were many technical, regulatory and socio-cultural barriers preventing the immediate uptake of the new system, it certainly inspired the imagination of industry and government actors, and allowed important new conversations about phosphorus futures to germinate.²³

Our final example builds upon the Funny Dunny Project and its cross-university collegiality, to further explore how design can facilitate social engagement and learning. The Transdisciplinary Living Lab (TDLL) model was developed in 2016–2017 as a collaboration between Design at UTS, Design at Western Sydney University and the Institute for Sustainable Futures at UTS. The TDLL emerged out of a design studio at UTS exploring the problem of food waste at local, societal and global scales.²⁴ A new food waste system had recently been installed at UTS, which was designed to eventually process 100% of the food waste generated on campus. This system had the capacity to transform

21 Geels (2002).

22 Dena Fam et al., 'Transdisciplinary learning within tertiary institutions: A space to skin your knees', in *Interdisciplinary and Transdisciplinary 'Failures' as Lessons Learned—A Cautionary Tale*, ed. by Dena Fam and Michael O'Rourke (London: Routledge, 2020), pp. 198–216, <https://doi.org/10.4324/9780367207045-16>.

23 The project was awarded an NSW Green Globe Award for Sustainable Innovation in 2012.

24 The lab process is explained in Alexandra Crosby, Dena Fam and Abby Mellick Lopes, 'Wealth from waste: A Transdisciplinary approach to design education', in *Cumulus Hong Kong 2016: Cumulus Working Papers 33/16: Open Design for E-verything*, ed. by Cecile Kung, Elita Lam and Yanki Lee (Hong Kong Design Institute, Hong Kong, November 21–24, 2016), pp. 51–55.

most organic materials including grains, coffee grounds and meat into a 'soil conditioner' that could potentially be reused in local gardens and parks, via a process of low-temperature dehydration. Students in the Interdisciplinary Design program at UTS were tasked with researching the problem context of global food waste whilst also examining and reflecting on their own food practices, and proposing new concepts for how the university community could learn about the value of the system and take responsibility for what were sometimes new practices of separating organics from other waste streams in an institutional setting. Finally, students considered the impacts of their designs in relation to the SDGs and 'planetary boundaries',²⁵ and reflected on how the Living Lab had influenced their thinking about their future design careers.

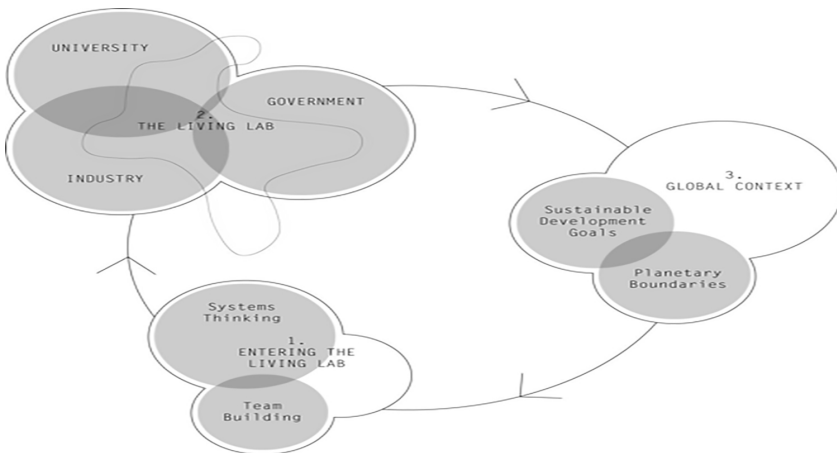


Fig. 5 Overview of key stages of skills development in the Transdisciplinary Living Lab model.²⁶

The TDLL supports an approach to learning that starts with the familiarity of personal experiences and practices, what Fry terms

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- 25 Johan Rockström, et al., 'Planetary boundaries: Exploring the safe operating space for humanity', *Ecology and Society*, 14.2 (2009), <https://www.ecologyandsociety.org/vol14/iss2/art32/> and <https://doi.org/10.5751/es-03180-140232>.
- 26 Alexandra Crosby, Dena Fam and Abby Mellick Lopes, 'Transdisciplinarity and the 'Living Lab Model': Food waste management as a site for collaborative learning', in *Transdisciplinary Theory, Practice and Education: The Art of Collaborative Research and Collective Learning*, ed. by Dena Fam, Linda Neuhauser and Paul Gibbs Fam (Switzerland: Springer International Publishing, 2018), pp. 117–131, https://doi.org/10.1007/978-3-319-93743-4_9.

‘digging where you stand’,²⁷ to learning with and from others (essential to a transdisciplinary approach) to propose appropriate systemic intervention, and finally through to global impacts, introducing the concept of SDGs and planetary boundaries, within which our most mundane everyday practices are ultimately nested. This approach highlights that social learning must always be transformative of self and shareable with others.²⁸

When Western Sydney became a signatory on the SDGs in 2017, sustainability lost any residual marginal or voluntary status and took centre stage. As the University Commitment Statement suggests, sustainability requires all core areas of the university—curriculum, operations, research and engagement—to be considered together:

Universities will have a vital role to play in addressing (these) critical global challenges and achieving the Sustainable Development Goals. Universities have a responsibility through their teaching to equip the next generation of leaders, innovators and thinkers to understand the global challenges facing the world and the role they can play in rising to meet these challenges. Through their research and training of research leaders, universities are at the forefront of finding sustainable social, economic, environmental and technical solutions to global problems. Finally through their own operations universities can pioneer innovation and can set an example to other sectors and businesses.²⁹

Together, the three projects we’ve presented tell a story about the university’s role in facilitating the broader societal project of transitioning to more sustainable cultures and economies. These projects demonstrate the importance of a future focus, of embracing an experimental approach that might entail failure and redirection as part of the learning process, and the importance of testing ideas with people, to produce more socially robust knowledge.³⁰ They also demonstrate

27 Fry (2009), p. 224.

28 Mark Reed et al., ‘What is social learning?’, *Ecology and Society* 15.4 (2010), <https://www.ecologyandsociety.org/vol15/iss4/resp1/> and <https://doi.org/10.5751/es-03564-1504r01>.

29 Sustainable Development Solutions Network (SDSN), *University Commitment to the Sustainable Development Goals* (2019), <http://ap-unsdsn.org/regional-initiatives/universities-sdgs/university-commitment/>.

30 Julie Thompson Klein, ‘Transdisciplinarity and sustainability: Patterns of definition’, in *Transdisciplinary Research and Practice for Sustainability Outcomes*, ed. by Dena Fam, et al. (London: Routledge, 2017), pp. 28–42, <https://doi.org/10.4324/9781315652184>.

a collaborative approach that transcends the competitive relationship between universities that is often exacerbated in a climate of funding cuts. Given the short time frame we have to make major transitions across many aspects of society if we are to limit global warming to 1.5 degrees celsius, it is important that we rapidly move toward the idea of a *knowledge commons*³¹ for sustainability, to which we all contribute and can draw on in remaking society within our own small spheres of influence, care and responsibility. Finally, we believe these projects also tell a story about a transition taking place in the discipline of design, which has been instrumental in the rise of unsustainable consumption across the twentieth century, and therefore perhaps more than most, is the discipline that needs to remake itself.

31 J. K. Gibson-Graham, Jenny Cameron and Stephen Healy, *Take Back the Economy: An Ethical Guide for Transforming Our Communities* (Minneapolis: University of Minnesota Press, 2013), <https://doi.org/10.5749/minnesota/9780816676064.003.0002>