Co-creation in the built environment:

An exploration of end-user engagement in the urban living laboratory

by

Aaron Davis
Bachelor of Music (Classical Performance)
Bachelor of Architecture
Master of Sustainable Design
Master of Architecture

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School of Art, Architecture and Design
Division of Education, Arts, and Social Science



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South Australia

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Summary

This thesis is situated within the macro-scale challenge of reducing the greenhouse gas emissions associated with the built environment, focusing specifically on how co-creation can aid in the delivery of projects in this area. It begins by discussing the complexity associated with changes in sociotechnical systems through Multi-Level Perspective, theories of resilience, and Social Practice Theory. It then discusses the emergence of the living laboratory method and highlights the challenges associated with the shift in scale from a living laboratory to an urban living laboratory.

The thesis then discusses co-creation as a methodology for facilitating collaborative processes explores the distinction between co-creation, co-design, and co-production. A dialectic and a dialogic model of co-creation are proposed before the thesis returns to the context of the built environment to discuss the challenge of citizen engagement. A number of frameworks for defining and measuring participatory processes are explored that introduce the

Three case studies are presented through a blended methodology that includes elements of case study research, grounded theory, and phenomenology. The cases broadly describe the researcher's experiences of working within a living laboratory and facilitating a number of co-creation processes. In response to the observation of a lack of understanding of the value of end-user engagement among professional participants in the first two cases, a Value Network Analysis is presented in the third case. This analysis describes the value exchanges that are perceived by both professional consultants and end-user participants, and uncovers a number of differences between the two perspectives.

The thesis concludes with a series of observations about the way co-creation is planned, executed, and evaluated in urban living laboratory projects. Here it is suggested that more attention be paid to the way living laboratories are established, and that there is a need to focus on evaluating the process of co-creation as well as the outcomes.

This thesis has particular relevance to the fields of architecture, urban planning, co-creation, sustainability transitions, and living laboratories.

Declaration

This thesis presents work carried out by myself and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, are clearly acknowledged.



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Chapter 1 Introduction

The Intergovernmental Panel on Climate Change (IPCC) has estimated that cities are responsible for up to 9.1% of total global GHG emissions (IPCC 2014). It is therefore unsurprising that cities and urban environments are increasingly being looked upon as sites for action to reduce global greenhouse gas (GHG) emissions. Significant attention has been paid to the unrealized energy efficiency potential within buildings but it is becoming increasingly apparent that energy efficiency alone will not be enough to mitigate the impacts of climate change (International Energy Agency 2016; Manzini 2011).

Climate Change is a Super Wicked Problem (Levin et al. 2012; Rittel & Webber 1973), meaning there are a series of complex interrelationships that make both the problem and potential actions very difficult to define. In recent years, there has been increasing recognition that this complexity means that technological solutions alone will not be enough to address GHG emissions or sustainability issues more broadly, and therefore, that social and behaviour change approaches are of tremendous importance (Manzini & Tassinari 2013; Shove 2010). Within the Sustainability Transitions literature, this is envisioned as happening as a part of the development of new sociotechnical systems that blend technological and social foci (Geels 2002).

There are many understandings of behaviour change, but one of the key ways in which this can be understood at a population scale is through Social Practice

Theory (Reckwitz 2002; Shove, Pantzar & Watson 2012). The Social Practice Theory approach used in this thesis reorients the minimal unit of society from being individual attitudes or desires, to the concept of social practices which bridge between physical, cognitive and sociocultural realms (Nicolini 2012). The social practice model then allows sustainability transitions to be conceived through the resilience of practices rather than more simple scale-based or tipping point models (Geels 2002; Gladwell 2006).

One of the structures that has emerged as a way of facilitating sociotechnical innovation is the living laboratory. The establishment of living laboratories methodology has received significant support from the European Network of Living Laboratories which was established in the late-2000s by the European Commission (CORDIS 2008). One of the primary functions of a living laboratory is to bring together public institutions, private companies, government and end-users to co-create innovations. The co-creation process and living laboratories are closely linked The treatment of the user in these processes is the subject of much debate, and is further complicated by the shift in scale associated with the urban living laboratory (Del Gaudio, Franzato & de Oliveira 2018; Franz 2014; Haukipuro, Heikkinen & Kivimäki 2013; Logghe, Oelbrandt & Schuurman 2014). Urban living laboratories can be described at their simplest as living laboratories that work on challenges at the scale of the built environment (Bulkeley et al. 2018). However, the scale shift brings with it a series of challenges, including the interface between legislated and voluntary consultation and collaborative processes, the complexity of significant interdisciplinary as well as end-user collaboration, and issues around power, dominance, coercion and control (McCormick & Hartmann 2017; Sennett 2012; Stember 1991).

This research explores these issues, investigating the conditions in which co-creation is applied to projects in the built environment as well as how the co-creation process is planned, carried out and evaluated. One of the key challenges that is discussed is that the prevailing method for measuring the quality of public consultation equates engagement quality with involvement in decision making processes. This sits uncomfortably with the notion of dialogic (process-focused) rather than dialectic (outcome-focused) collaboration and with the focus of the co-creation approach on process more generally (Sennett 2012). Alternative approaches from the urban planning literature including Critical Pragmatism

(Forester 2013) question how fixed these ways of measuring consultation are. Critical pragmatism is a way of translating the ideals of the egalitarian co-creation process into the realities of the construction industry, addressing issues of power and dominance, as well as introducing a discussion on multiple forms of knowledge and competing value systems (Forester 2013; Quinn 1988; Sennett 2012).

What can be taken from Critical Pragmatism, is the notion that the value of a co-creation process cannot be easily understood because there are a number of different understandings of what is meant by value. This is addressed in this research through the exploration of a more nuanced approach to quantifying the value of these processes.

The consistent threads of investigation that run through this research include the role of the professional designer in collaborative processes (Forester 2013; Tan 2010), and the context-based factors that impact on the work of the urban living laboratory (McCormick & Hartmann 2017). These threads lead to explorations including the power dynamics that are at play in the urban living laboratory, the impact of specific techniques for co-creating with users, and the impact of multiple forms of knowledge on the types of value being transacted during the co-creation process (Cialdini 1993).

The research is funded as a part of a Cooperative Research Centre for Low Carbon Living (CRCLCL) and is attached to the Adelaide Living Laboratory. As will be outlined in the case study discussion, the CRCLCL includes a wide range of projects, some of which are highly technically focused. The tension between these technically-focused projects and this more socially-focused research emerged as a significant feature and challenge of the research process, leading to the process of conducting this research itself being discussed as a part of this thesis.

1.1 Thesis structure

The thesis is structured in 12 chapters. Following this introduction, Chapter 2 is focused on the link between global GHG emissions, cities, and behaviour change. It discusses these concepts through the lens of sustainability transitions, resilience, social innovation, and Social Practice Theory (Geels 2002; Murray, Caulier-Grice & Mulgan 2010; Shove, Pantzar & Watson 2012; Walker et al. 2004). Chapter 3 then explores the concepts of the living laboratory and the urban living laboratory.

It describes the history of the living laboratory concept and outlines two broad orientations for living laboratories: technical and social (Franz 2014). These models are differentiated through both the methodological frameworks they use to conduct research, and the way they approach end-user engagement (Franz 2014). These concepts are then discussed in the context of projects in the built environment before a framework from the Governance in Urban Sustainability Transitions network is used to differentiate between the characteristics of a living laboratory and an urban living laboratory (McCormick & Hartmann 2017).

Chapter 4 then explores the concept of co-creation, and the distinction between co-creation, co-design and co-production. This chapter focuses on the role of co-creation in facilitating end-user engagement in design-led processes, but also explores the application of co-creation to professional collaboration. It highlights that although professional collaboration is an assumed part of urban living laboratory projects, it questions the degree to which it is considered in the planning and execution of co-creation processes. Finally, this chapter introduces a distinction between a dialectic and a dialogic model of co-creation, highlighting the importance of focusing on processes rather than outcomes in dialogic co-creation.

Chapter 5 then returns to the built environment, describing current consultation practices in the development industry before discussing how legislated consultation practices interface with the urban living laboratory. It is in this discussion that co-creation is separated from compulsory consultation, arguing there is significant risk in approaching co-creation in urban living laboratories as a way of facilitating urban planning-based consultation processes. The chapter then introduces some of the complex power-dynamics that emerge in consultation processes, and explores how the theory of Critical Pragmatism and dialogic co-creation processes may be able to mitigate the impact of these power dynamics (Forester 2013). Through this discussion a question emerges about the value of consultation processes, and therefore of co-creation processes. This is explored in a range of ways, including through the economic anthropology literature, presenting a series of ways in which the concept of value can be understood. This chapter establishes one of the fundamental questions in this thesis which is whether co-creation can be considered to be an asset rather than a liability. That is,

whether it is possible to quantify value in these processes through a process that goes beyond rationalist or risk-based economic arguments.

Chapter 6 outlines the methodological approach for the case study research in this thesis. This research uses a blended methodological approach incorporating a Case Study methodology (Yin 2009), Grounded Theory (Glaser & Strauss 2017) and Phenomenology (Babbie 2016; Goulding 2005). This chapter describes how the blending of these three methodologies allows the researcher to participate in, and investigate, real-world case studies through a variety of perspectives and data sources.

The following four chapters (Chapter 7, Chapter 8, Chapter 9, and Chapter 10) present three case studies. These case studies are very different in scale and scope, and facilitate a wide-ranging exploration of the conditions within which co-creation is applied in the built environment. The first two case studies focus on how co-creation is applied within the structures of the urban living laboratory, while the final case study steps outside of the living laboratory to explore the value of a co-creation approach within a market-based project.

Because of the significant differences between the three cases, comparisons between the cases are taken into Chapter 11 where they are discussed separately from the detail of the specific cases. The final chapter, Chapter 12, then revisits the main points of the argument, setting out the key findings from this research, the key contributions it makes to the literature, and key areas for further research.

Chapter 2 Addressing the carbon impact of the built environment through a Social Practice lens

This chapter introduces the macro-scale challenge of climate change, and specifically investigates the ways in which the built-environment can be seen as a site for taking action to reduce global greenhouse gas (GHG) emissions and build community resilience. Sections 2.1, and 2.2 unpack the importance of reducing the GHG emissions of cities while also acknowledging some of the limitations of efficiency-driven approaches. From section 2.3 onward the chapter then focuses on the role of social change in addressing the GHG emissions related to the built environment, discussing the concepts of resilience, and social innovation in some detail. The chapter then shifts to a discussion on Social Practice Theory as a way of understanding macro-scale behaviour change (Shove 2010; Shove, Pantzar & Watson 2012) and Multi Level Perspective (Geels 2002) as a way of conceptualising different levels of change in sociotechnical systems.

2.1 The Grand Challenge: Climate change mitigation and adaptation

The challenge of halting human-induced climate change is complex and multi-faceted and reflects many of the dimensions of wicked problems and super wicked problems described by Rittel and Webber (1973) and Levin et al. (2012) respectively. Rittel and Webber (1973) define ten key-elements of a Wicked Problem:

1. There is no definitive formulation of a wicked problem
2. Wicked problems have no stopping rule
3. Solutions to wicked problems are not true-false, but good-bad
4. There is no immediate and no ultimate test of a solution to a wicked problem
5. Every solution to a wicked problem is a "one shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly
6. Wicked problems do not have enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan
7. Every wicked problem is essentially unique
8. Every wicked problem can be considered to be a symptom of another problem
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution
10. The planner has no right to be wrong (Rittel & Webber 1973).

In reflecting on the challenge of climate change, Levin et al. (2012) add a further four features to this list to define super wicked problems:

1. Time is running out
2. Those seeking to end the problem are also causing it
3. No central authority
4. Policies discount the future irrationally

These descriptions begin to highlight some of the complexity associated with reducing the GHG emissions of the built environment and show some of the inherent difficulties in this challenge. In describing wicked problems through the lens of design thinking, Buchanan (1992) argues that wicked problems transcend political, cultural, and ideological borders, requiring complex and cooperative approaches.[1]

[1] The relationship between design thinking and wicked problems will be explored in more detail in Chapter 4.

As the global population increasingly urbanises and the built environment grows its physical and impact-based-footprints (discussed further in section 2.2), buildings and the cities they help create become an important site for action to combat climate change. In their breakdown of total GHG emissions (Figure 2.1), the Intergovernmental Panel on Climate Change (IPCC) estimates that in 2010, buildings were responsible for approximately 6.3% of direct GHG emissions as well as 12% of the indirect greenhouse gas emissions resulting from electricity and heat production (c.2.8% of total emissions). Together, this means buildings are responsible for 9.1% of total global GHG emissions (IPCC 2014, p.47).

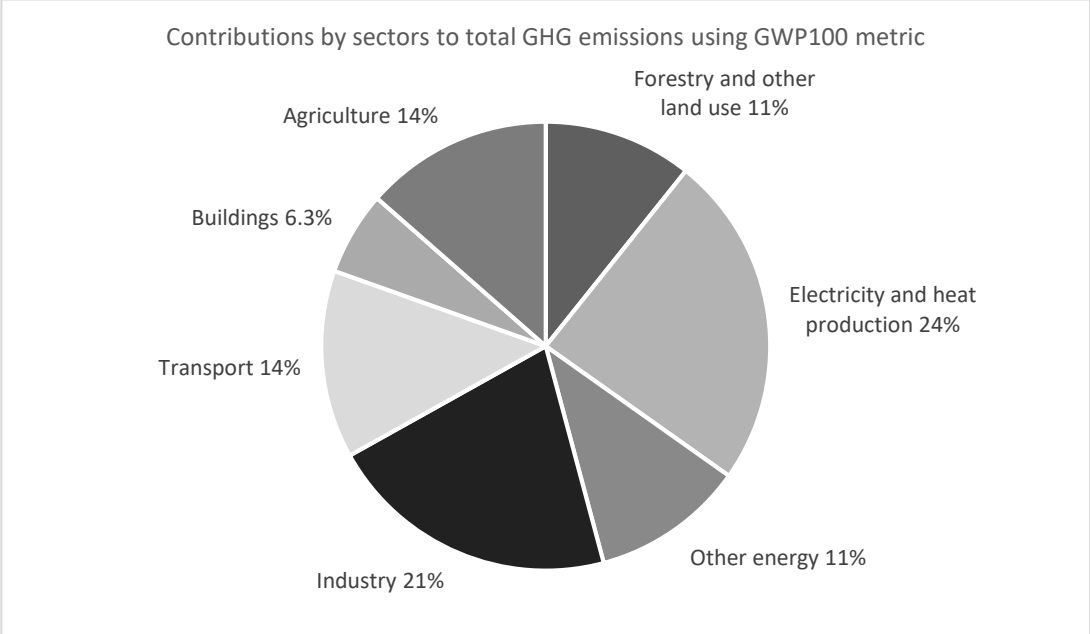

Figure 2.1: IPCC Breakdown of total global GHG emissions by sector using GWP100 metric (IPCC 2014)

In their assessment of the potential for GHG emission reduction, the International Energy Association (IEA) found that over 80% of the efficiency that is assumed to be possible through both upgrades and innovation in construction practices is currently unrealised, and signalled a significant opportunity for action (International Energy Agency 2012).

This unrealised potential makes research into improving the energy efficiency of buildings (both in new construction and retrofitting) compelling for researchers seeking to lower the GHG emissions of buildings, and, for building owners who stand to gain from the financial windfall of operating a more efficient building. It also, however, obscures the larger role that buildings and the construction industry supply chain may play in overall GHG emissions by treating buildings as isolated physical infrastructures rather than elements within a sociotechnical system, directing focus toward technical rather than social approaches.[2]

The impact of technological energy-efficiency approaches is limited to addressing the 9.1% of GHG emissions that are attributed to buildings. Even if the full 80% shortfall in reduction potential described by the IEA could be addressed through efficiency upgrades and the adoption of zero net-GHG emission construction as an industry standard, the 9.1% reduction in overall GHG emissions falls short of the reductions demanded by the IPCC (IPCC 2014) and agreed to under the Paris Agreement (Rogelj et al. 2016). Treating buildings as a part of a broader sociotechnical system rather than discrete objects, however, may uncover opportunities to contribute to GHG reductions beyond this 9.1% ceiling by beginning to facilitate changes in the broader functioning of society.

2.2 From buildings to cities to the built environment

Buildings are often the scale at which cities are seen to evolve and change, yet when considering GHG emissions, the impact of cities and urban environments extends beyond those attributed to buildings. An assessment of the GHG emissions of cities rather than buildings would include significant proportions of the GHG emissions ascribed by the IPCC to agriculture, forestry, transport, and industry because these areas exist largely to serve cities. In more concrete terms, rising rates of consumption of goods and services, as well as demand for increased mobility drive the construction of immense supporting physical and social infrastructures as well as buildings (IPCC 2014).

In order to frame the GHG emissions of cities rather than individual buildings, it is important to define the boundaries of a city. Two terms that are commonly used in describing cities are ‘urban environment’ and ‘built environment’. The term

[2] This will be described further in section 2.3.

'urban-environment' is perhaps more descriptive; however, the limitation of the boundaries to areas that are considered urbanised negates many of the impacts that cities have on their supporting regions, including the range of supporting industries described above. The term 'built environment' by contrast, can be used to capture these areas, describing an urban system that is supported by its regions, or more accurately, the set of locations through which our sociotechnical system plays out. There are a number of formal definitions of the built environment, but a common element in these definitions is described by Saelens and Handy (2008, p.2) as 'the part of the physical environment that is constructed by human activity'. This expands the boundary of the built environment beyond urban areas, capturing all areas in which humans have a direct or indirect impact. Moffatt and Kohler (2008) caution that for historians and geographers this can make the boundaries of the built environment very difficult to define because most of the world is considered to have been impacted in some way through human activity. The notion however, of understanding the built environment as physical territory that is *impacted by* rather than *constructed by* human activity, shifts the focus to locations that are shaped by the socio-technical, socio-economic and socio-cultural systems of cities (Moffatt & Kohler 2008).

From this it might be argued that boundaries can be drawn through an interrogation of the intensity of human impact rather than the presence of human impact, capturing and acknowledging extra-urban impacts while still maintaining a primary focus on urbanised areas.

2.3 Addressing climate change through the built environment

The built environment is increasingly being looked to for strategies to address climate change by creating urban environments that support low-carbon living (UN Habitat 2011). The vast array of interrelated physical, technological, social, economic and cultural layers mean that there are a broad range of approaches that can reduce the GHG emissions associated with the built environment. These can broadly be classified as those that are top-down or government led, and those that are bottom-up or citizen led.

Many top-down approaches focus on the decarbonisation of city functions through the development of more efficient ways of operating a city (Alcott et al. 2012). These often focus on decarbonising energy, transport, food production and other

key city functions (Alcott et al. 2012). Bottom-up approaches by contrast, often focus on either individual agency or on the creation of new social and cultural structures that can reduce the carbon intensity of day-to-day life (Alcott et al. 2012). The following sub-sections will briefly describe some of the challenges associated with these approaches, before describing how top-down and bottom-up approaches can be combined.

2.3.1 Top-down approaches

The *World Energy Outlook 2012* report highlights the importance of driving energy efficiency through technological interventions (International Energy Agency 2012). Efficiency focused interventions include the use of optimisation algorithms to reduce waste in the construction process,[3] as well as the use of automation in building management systems to improve operational efficiency (Shaikh et al. 2014). In a more recent version of this report, the focus on efficiency has for the most part been redirected toward ways of driving 'secure, sustainable and inclusive economic growth' (International Energy Agency 2016, p.284).

However, the translation of efficiency into economic growth can reduce or negate any environmental benefits of efficiency. This phenomenon was first described in 1865 by economist Stanley Jevons (Jevons 1865). Jevons noted that efficiency gains in England's coal engines were not translating into an equal reduction in coal consumption (Jevons 1865). Instead, the increased efficiency put downward pressure on the price of energy and encouraged greater consumption. Jevons' work was later described as the Jevons Paradox where gains from energy efficiency are realised through an increase in productive output rather than a reduction in consumption (Alcott et al. 2012; Clark & Foster 2001).[4]

York (2010) provides an interesting discussion of this relationship, suggesting the Jevons Paradox is at the heart of the challenge of climate change. He suggests that technological approaches to reducing GHG emissions will not work unless the underlying (politically driven) issues of consumption and economic growth are addressed (York 2010). In many ways this reiterates the earlier work of the Club

[3] This is primarily through the application of principles developed in Computer Aided Manufacturing processes (Tilley & Van Brussel 1992) to the built environment

[4] This is also picked up in the work of Hartmut Rosa who explores the relationship between technological progress and free time (Rosa 2003, 2010, 2013)

of Rome (Meadows, D et al. 1972) by highlighting the impossibility of never-ending growth in the consumption ecological resources.

2.3.2 Bottom-up approaches

Although the dominant political focus on consumption and economic growth at a national scale has remained relatively unchallenged (York 2010), there are examples of bottom-up action by smaller communities that have challenged the wisdom of perpetual growth and technological fixes. Perhaps the most famous example is the American counterculture movement of the 1960s and 70s. The counterculture movement presented a radically different way of relating to the environment and to broader political systems (Turner 2010). Rather than concentrating on political activism to affect top-down change (as was being advocated for by the New Left at the time), these counterculture movements focused on removing themselves from the dominant political and socio-technical systems and establishing their own communities (Conn 2010; Turner 2010). The problems associated with these communities are well described by Conn (2010), but they are interesting because they allowed the assumptions described above as driving the Jevons Paradox (growth and consumption) to be challenged.

One of the key challenges faced by many bottom-up community actions is the question of scale. This will be further addressed in the discussion on the work of Geels (2002) in section 2.6, but in the counterculture movement, an interesting example of addressing scale can be seen in the actions taken by Stewart Brand.

One of the key challenges associated with the establishment of new self-contained communities was getting access to knowledge and (often historic) technologies (Turner 2010). In response to this, Brand created the Whole Earth Truck Store (WETS), a travelling shop that provided these communities with the equipment and skills required to be self-sufficient (Turner 2010; Whole Earth 2018). Although the WETS was largely successful, as the counterculture movement grew, it became clear that the WETS was unable to carry a full range of stock and could only visit each community with limited frequency. Faced with this challenge, Brand developed the Whole Earth Catalogue (Figure 2.2 below) (Turner 2010).

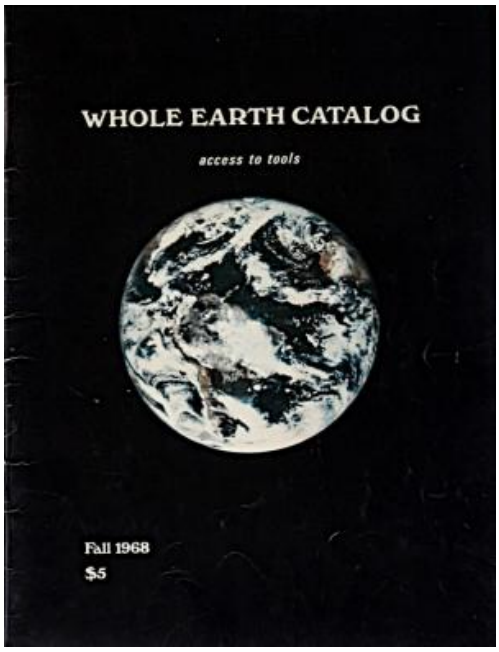

Figure 2.2: The Whole Earth Catalog First Edition, Fall 1968 (Whole Earth 2018)

First published in 1968, the Catalogue connected people directly with the knowledge and technological tools required for a DIY approach to self-sufficiency (Crocker 2012; Whole Earth 2018). This effectively created a decentralised network that could scale and grow, acting as a connector rather than a distributor and increasing the reach of information, products, and services that could support ecologically sustainable lifestyles (Turner 2010; Whole Earth 2018). The catalogue would go on to become a key precedent for the development of distributed information systems and open source platforms (Crocker 2012; Turner 2010), and was notably linked with the emergence of the concept of an internet search engine by Steven Jobs (Jobs 2005).

2.3.3 Top-down and bottom-up approaches

The IPCC make a series of references to climate change adaptation being a social as well as technological challenge, highlighting the importance of addressing what is typically considered a bottom-up process of social change alongside the top-down process of technological development.[5] The importance of considering the

[5] The equation of social change with bottom-up action will be further developed in sections 2.7 and 2.8.

bottom-up or social component is particularly highlighted by the IPCC (2014, p.80) with the suggestion that 'underestimating the complexity of adaptation as a social process can create unrealistic expectations about achieving intended adaptation outcomes'.

This is taken further by both Manzini and Coad (2015) and Sharifi (2016), who suggest privileging social factors over technological development. Manzini and Coad (2015) specifically designate sustainability challenges, such as reducing the GHG emissions of the built environment, as social rather than technological challenges. They take the position that although communities and culture shifts because of, and with, technological development, large-scale change is a product of socio-technical shifts rather technological developments or discoveries (Manzini & Coad 2015). Sharifi (2016, p.13) is more specific, suggesting that planners and policy makers working toward 'eco-developments', need to focus on social consequences and engagement rather than technological determinism.

A project that appears to demonstrate the blending of top-down and bottom-up action is the MyNeighbourhood project. This project was funded by the European Union within an ICT Policy Support Program and sought to challenge the highly technological-focus of Smart City research (Concilio et al. 2013). MyNeighbourhood aimed to embed a human element into the Smart City concept, creating

> a new and 'smarter' conception of the 'Smart City' that focuses on people and their well-being rather than just ICT infrastructures and dashboards (ENoLL 2014, p.7).

In this project, the primary focus was on the co-creation of social infrastructure including a tool repository, food co-op, car-sharing, community garden, co-working space, and clothes swap. This meant that rather than driving the innovation, the ICT infrastructure acted as a support for the effective realisation of the social programs. The overarching aims of the MyNeighbourhood program were to

> develop socio-digital innovation environments that help to
> 1. Rebuild neighbourhoods
> 2. Empower neighbourhoods, and
> 3. Scale neighbourhood value up in a manner that reconnects people, recreates communities, and, ultimately, makes cities smarter (Concilio et al. 2013, p.15).

This can be seen as being somewhat similar to the goals of the Whole Earth Catalog described above, connecting people with the technological infrastructures

required to achieve their social goals. In considering how the project might address the questions of scale and longevity, the MyNeighbourhood project focused on establishing social connections and relationships so that the project would leave a legacy of a stronger and more resilient community (Concilio et al. 2013).

2.4 Resilience

The notion of resilience is an important addition as well as counterpoint to reducing GHG emissions because it shifts the discussion from a technological argument to the consideration of sociotechnical systems. This will be unpacked to some degree here, and returned to in the discussion of Case A in Chapter 7 and Chapter 11.

The concept of resilience is linked with socially-led approaches to sustainability in a special issue of *Building Research and Information* edited by Stevenson and Petrescu (2016). In differentiating between a technological and a social approach to sustainability, they define technologically-oriented approaches to sustainability as focusing on

> the capability of human communities to improve the local quality of life while remaining within the environmental carrying capacity (Gibberd, 2015 in Stevenson & Petrescu, 2016, p. 695).

By contrast they suggest that socially-oriented approaches focus on resilience rather than sustainability, that is

> the capabilities and capacities of human communities to thrive in response to uncertainty, threats, disturbances and shocks (e.g., rapid climate change and its impacts) (Brown, Kraftl, & Pickerill, 2012 in Stevenson & Petrescu, 2016, p. 695).

A more formal definition of resilience by Walker et al. (2004) suggests resilience is

> the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004, p. 2).

Walker et al. (2004) then describe four key elements of a framework for measuring resilience: latitude, resistance, precariousness, and panarchy (Walker et al. 2004). Latitude is defined as the amount of change that can occur without compromising the ability to return to an original state. This is combined with resistance, or the difficulty in making change to establish a steady state of resilience. Precariousness describes how close a system is to change, while panarchy captures the broad range of external influences on a system (Walker et al. 2004).

In a more recent paper, Vale (2014) explores the ways in which a variety of disciplines approach resilience, defining two primary understandings of the concept: an equilibrium or stability model, and a non-equilibrium or progressive model (Vale, 2014, p. 192). These two models can be nested within Walker et al.'s framework for measuring and defining resilience, but provide two very different foci. An equilibrium or stability model focuses on resisting change, while a non-equilibrium or progressive model focuses on embracing change as a part of resilience (Vale 2014).

Vale (2014) suggests that most disciplines, from Management and Information and Communication Technology to National Security, have adopted the equilibrium or stasis model, with resilience being considered the ability to withstand disturbances or shocks. Relatively few disciplines, he suggests, understand resilience as an evolutionary or non-equilibrium process and even within fields such as ecology where evolution and change are critical, the resilience of a system is often considered in terms of its ability to 'recover from' rather than 'adapt to' events or changes (Vale 2014).

In understanding systems, it is useful to link equilibrium-based resilience with the concept of sunk-costs (Arkes & Blumer 1985). The sunk cost effect describes the impact of past investment in a system on its future form and direction (Arkes & Blumer 1985). Because these investments are irrecoverable, they create a tremendous resistance to change and lead to further investments perpetuating the status quo and making the system even more resilient (Crocker 2012). Sunk costs are typically described in terms of economic investment but can also describe the impact of social and cultural investment; this means that notions of tradition, history, or past experience can also lead to systems where change becomes unthinkable (Coleman, MD 2009; Cunha & Caldieraro 2009; Rego, Arantes & Magalhães 2018).

In technical terms, equilibrium-based resilience is typically measured through the redundant capacity that is present in the system while non-equilibrium resilience is demonstrated through the ability to 'adapt and adjust to changing internal and external processes' (Pickett, Cadenasso & Grove 2004, p.373). For architecture, the equilibrium or stasis model is manifest in the ability of buildings to withstand use, significant weather events, and natural or man-made disasters. A non-equilibrium model may be observed in adaptive reuse projects, or design for

disassembly approaches (Crowther 1999; Laboy & Fannon 2016; Peterson 2003). In social terms, equilibrium-based resilience would describe a community that has enough redundant links to maintain its existing form and structures despite pressure to change. Non-equilibrium-based resilience would describe a community that is able to stay strong while also changing and adapting to internal or external forces.

Vale (2014) argues cities are complex and ever-changing systems where 'stasis' is flux; this means the normal state for a city is a state of change. He therefore concludes that the resilience of city systems should be defined by the ability to manage change rather than to resist change (Vale 2014).

The debate between an equilibrium or stability model of resilience and a non-equilibrium or progressive model of resilience is not new and can be traced as far back as a debate between Parmenides and Heraclitus in c.700BC. Parmenides described objects and matter as having permanence while Heraclitus instead developed a worldview where all matter was in a constant state of flux. As an extension, a Parmenidean worldview would most closely describe the equilibrium model of resilience where it is possible to maintain stasis, while a Heraclitian worldview would suggest this is fundamentally impossible because all things are in constant flux.

These two worldviews and understandings of resilience co-exist within Walker et al.'s (2004) definition of resilience and can also be seen to connect with the concept of 'resourcefulness' (Derickson & MacKinnon 2015; MacKinnon & Derickson 2013). Resourcefulness links the two concepts of resilience described by Vale (2014) by suggesting that resource management at the micro and meso scales can be seen as an adaptive process, while at the macro scale, planetary boundaries enforce an equilibrium state. This demonstrates the notion of panarchy in Walker et al.'s (2004) definition, and shows how the concepts of equilibrium and non-equilibrium resilience can interface.

2.5 Social Innovation

The remarks on Manzini and Coad (2015) and Sharifi (2016) in section 2.3 highlight the importance of addressing the social dimensions of innovation and technological development. Social Innovation describes innovation in social

structures, processes, or relationships through the application of models of innovation to social rather than technological challenges (Hubert 2010).

In a report for the European Commission, Hubert (2010) traces elements of theories of Social Innovation to Karl Marx, Max Weber, Emile Durkheim, and Joseph Schumpeter, but concludes that the contemporary understanding of Social Innovation has emerged since the 1990s. He then defines Social Innovation as

> new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations (Hubert 2010, p.33).

A similar but simpler definition is provided by Mulgan et al. (2007, p.8) who describe Social Innovation as the creation of 'new ideas that work in meeting social goals'.

Another is presented by Howaldt et al. (2014, p.9) who define Social Innovation as

> A new combination or figuration of practices . . . with the goal of better coping with needs and problems than is possible by using existing practices.

Hubert (2010) and Mulgan et al. (2007) are careful to distinguish between innovation and invention by including an element of successful application alongside the assertion that success should be defined through social rather than technological or economic metrics. This distinction will be critical in the discussion of different models of living laboratories in section 3.2 and the evaluation of the case study projects in section 11.3. The use of the term innovation rather than invention also connects with the behaviour change and Social Practice concepts that will be discussed in sections 2.7 and 2.8 by focusing on the systemic impacts of a Social Innovation rather than the process of its emergence or its technical execution.

In defining the kinds of issues that can be used to frame Social Innovation challenges, Murray Caulier-Grice and Mulgan (2010) suggest crises, efficiency, performance, and technologies should be key areas of focus. Their notion of crises aligns Social Innovation approaches with the need to adapt to the challenges caused by climate change. However, given the categorisation of climate change as a super wicked problem in section 2.1 and therefore the fact that time is running out (Levin et al. 2012), it is interesting to consider the relationship between different models of social innovation and the timeliness of their impact.

The use of social rather than technological or economic outcomes to define success can be used to separate Social Innovation from technological innovation that is developed socially. In proposing a 'Connected Difference' Theory of Social Innovation Mulgan et al. (2007) begin to highlight the importance of process-based outcomes describing Social Innovation as

> - involving the recombination of existing elements in a system rather than the development of new elements
> - cutting across organisational and disciplinary boundaries, and
> - forming new social relationships between participants that are strong and long-lasting. (Mulgan et al., 2007)

Elements of this definition have been further developed by researchers in the EU funded project *Social Innovation: Driving Force of Social Change* (Butzin et al., 2014). Here Social Innovation is specifically connected with Social Practice Theory (discussed further in section 2.8), with Social Innovation defined as

> a new combination or figuration of practices in areas of social action, prompted by certain actors or constellations of actors with the goal of better coping with needs and problems than is possible by using existing practices. (Butzin et al. 2014, p.9)

These definitions begin to shift the focus of Social Innovation away from a retrospective categorisation, toward a more aspirational definition that can be used to design and shape Social Innovation processes.

In an attempt to describe the applications of Social Innovation, Nussbaumer and Moulaert (2007) provide an overview of the kinds of processes and outcomes that can be considered Social Innovation. They highlight that Social Innovations can be isolated small interventions with localised impact, or large shifts in the way a system is structured, and that Social Innovations can provide anything from incremental improvement to radical transformation through the socialisation-of and subsequent solidarity-with an entrepreneurial idea (Nussbaumer & Moulaert 2007 in Hubert 2010).

The following three subsections illustrate some specific approaches to social innovation that are broadly defined as: bottom-up social innovation, distributed social innovation, and facilitated social innovation. These are a useful starting point for the discussion on living laboratories in Chapter 3.

The three categories that are used in this discussion are not discrete and there are many crossovers between the approaches. The 5000+ project that will be discussed is an interesting example of a project that crosses between these categories,

incorporating elements of facilitated social innovation with distributed social innovation while also trying to support and encourage bottom-up social innovation.[6]

2.5.1 Bottom-up social innovation

An often-cited example of Social Innovation occurs when new social structures emerge in response to critical stimuli including structural challenges such as exclusion, inequality or indeed rapid new-found wealth (Moulaert 2013). In this case, the recombination of ways of interacting and working give rise to new social structures (innovations) that have the potential to catalyse shifts in the broader social system.

This is described in the Organisational Management literature as Positive Deviance (Pascale, Sternin & Sternin 2010; Spreitzer & Sonenshein 2004). Positive deviance describes behaviours that deviate from the norm in order to achieve a positive outcome; this includes innovation and creativity as well as concepts such as organisational citizenship, whistle-blowing, and corporate social responsibility (Spreitzer & Sonenshein 2004). This has been a particular focus in international development where communities are looked to as a source of innovative solutions (such as Kumar et al. 2016; Zeitlin 1991).

In these cases the innovation or deviance is occurring prior to its recognition. The people creating these Social Innovations can therefore be seen as similar to Von Hippel's concept of lead users (Von Hippel 1986).[7]

It should also be noted that bottom-up social innovations are not always positive and good for communities. Although positive deviance seeks to uncover positive examples of this phenomenon, negative bottom-up social innovations can also

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[6] This project was run by the Government of South Australia, the City of Adelaide, and surrounding local governments and was focused on creating a shared vision for the future of the inner Adelaide area. As a part of the crowdsourcing process, residents were encouraged to contribute, discuss, and vote on ideas for projects. This intelligence was then linked with a series of expert forums to deliver recommendations for the strategic direction of the city (Integrated Design Commission SA 2011).

[7] Lead users are individuals or communities that have encountered a need before the general population and can therefore be engaged as a source of inspiration for new product design (Von Hippel 1986). In the context of Social Innovation, lead users are those that may have made, or be in the process of making, modifications to existing systems or technologies to make them better suit their needs.

emerge. This can be seen for example, in the emergence of sub-standard housing conditions in Europe in response to the industrial revolution (Foster 2003; Halliday 2001; Timmins 2013). In the context of climate change adaptation, it is therefore important to consider the extent to which a 'wait and see' approach of relying on bottom-up social innovation to emerge is appropriate.

2.5.2 Distributed social innovation

The term 'crowdsourcing' was coined by Jeff Howe in 2006 in *Wired* magazine as a way of describing a new form of informal and open online outsourcing that created an online community (Howe 2006, 2008).[8]

Murray Caulier-Grice and Mulgan (2010) and Füller, Hutter and Fries (2012) argue the use of crowdsourcing in Social Innovation is less common than in technological development because of difficulties in framing social questions, and in realising value for participants. However, Howe (2008) suggests that economic reward is not a common motivation for participation in crowdsourcing activities. He highlights instead that the opportunity to share knowledge, learn from more experienced peers, express latent creativity or explore an extra-vocational interest are more common motivations (Howe 2008). These elements were also supported through the empirical findings of Füller, Hutter and Fries (2012) with the addition of altruism as a motivator for Social Innovation projects.[9]

Many crowdsourcing platforms however, have become tremendous commercial successes and have upended traditional processes through the development of new economic models. The disruption of the stock photo industry is a common example of this (Howe, 2008). However, where motivation for participation shifts

[8] Howe places great attention on the social and communal aspects of crowdsourcing, viewing the crowd as an online community rather than a resource for obtaining cheap outsourced labour (2008). Howe's conception of crowdsourcing differs from earlier concepts that are often considered similar or seen as a starting point for crowdsourcing. For example, Saxton et al. (2013) trace crowdsourcing to the British government's 1714 decision to host a competition to solve 'The Longitude Problem', but this competition did not feature any form of community interaction (community of participants) or communal decision making as to who should be proclaimed the winner. This distinction is critical when considering the use of crowdsourcing as a part of Social Innovation processes because it highlights the importance of facilitating a participant community rather than placing participants in competition with each other as advocated for in Tournament Theory (Lazear & Rosen 1981).

[9] These forms of value are similar to those that will be discussed in relation to participant motivations in living laboratory projects as will be discussed in section 5.8.

from intrinsic reward structures to extrinsic reward structures, crowdsourcing processes might be more accurately deemed informal outsourcing.

An example of this is the Amazon Mechanical Turk (MTurk) marketplace. This is described as

> a crowdsourcing marketplace that makes it easier for individuals and businesses to outsource their processes and jobs to a distributed workforce who can perform these tasks virtually. . . MTurk enables companies to harness the collective intelligence, skills, and insights from a global workforce to streamline business processes, augment data collection and analysis, and accelerate machine learning development (Amazon 2018).

This informal or digital outsourcing version of crowdsourcing is very different from Howe's original definition and cannot be used to solve Social Innovation challenges because the process itself is not social (Füller, Hutter & Fries 2012).

There are however, examples of social innovation approaches that use online environments to support social outcomes. The Adelaide 5000+ project for example used a series of online discussions and platforms to stimulate and collect insights and ideas from local citizens. This was combined with a series of live workshops and programs to catalyse significant innovation in the way Adelaide planned its future (Integrated Design Commission SA 2011).

2.5.3 Facilitated social innovation

There are a wide variety of approaches to the facilitation of social innovation (Mulgan et al. 2007; Murray, Caulier-Grice & Mulgan 2010; Brown 2012; Manzini & Coad 2015). These approaches are typically based on the concept of Design Thinking and are broadly structured around an inspiration phase, an ideation or iteration phase, and an implementation phase (Brown et al., 2012). Facilitated processes differ from the distributed or bottom-up social innovation models because of their focus on collaboration as well as the presence of a facilitator or facilitation process. The specific nature of these processes will be outlined further in Chapter 4 in the discussion of the co-creation process.

The co-housing work of Charles Durrett is an example of a facilitated process that enables communities to collaboratively establish a shared vision (Durrett 2009; McCamant & Durrett 2011). The facilitation processes use conversational techniques to help the community decide which facilities they would like to share and which they would like to remain private (Durrett 2009). By using the social

components of the development to drive the design process, these projects provide an example of the technological being developed in response to the social.

This approach is in sharp contrast to approaches such as Le Corbusier's Unité d'Habitation in Marseilles, France, where an entire social system was conceived by the architect, prior to construction and therefore prior to the community forming in what he considered a vertical, and largely self-contained city (Janson et al. 2007).

2.6 Sociotechnical innovation in Sustainability Transitions

The work of Ezio Manzini (Manzini 2006, 2011; Manzini & Coad 2015; Manzini & Tassinari 2013) focusses specifically on how Social Innovation can be used to facilitate Sustainability programs. This agenda has also been taken up more broadly by the Sustainability Transitions Research Network as well as groups such as URBACT (Sustainability Transitions Research Network 2018; URBACT 2018).

The Sustainability Transitions literature is broadly concerned with the process of transitioning our macro scale sociotechnical system to one that can function sustainably within the carrying capacity of the earth. A key concept within this literature is that within the macro-scale sociotechnical system, there are a series of nested and interrelated systems (Geels 2002). Making changes at the global scale, therefore becomes a question of making changes at smaller scales that catalyse shifts at the global scale. This is described by Geels (2002) through the framework of Multi-Level Perspective (MLP).

MLP is as a way of describing the process of technological transitions and has a significant focus on sociotechnical systems. It uses scale and time to describe the way in which technological innovations are adopted (or not) and provides a framework for understanding large-scale (national, transnational or even global) shifts in sociotechnical systems (Geels 2002).

MLP describes three levels of change: niche, regime, and landscape (Geels 2002). The niche level can be understood as elements that function at the scale of individuals and small communities. The regime scale is more complex and includes policy, governance and other institutional structures, as well as markets and cultures. The landscape level by contrast, is defined by Geels (2002) as sitting

outside of these definable elements; he variously describes this level as ‘landscape developments’ and ‘evolving sociotechnical landscapes’.

These three levels can be seen to some extent in Walker et al. (2004) who show resilient systems as being a part of both larger and smaller systems. However, Walker et al.’s (2004) model suggests an apparently infinite number of levels because of the implication that there will always be a larger and a smaller system rather than the three defined scales described by Geels (2002).

The term landscape might perhaps have some links drawn with geological time scales, with Geels (2002) himself describing an inherent slowness in transitions at the landscape level. However, as he describes in his illustration of the MLP framework, landscape change is not always slow. There are examples of relatively fast transitions of sociotechnical systems at this scale where social, technological, legislative, and infrastructural changes align to deliver rapid shifts in sociotechnical landscapes (Geels 2002).

The perceived slowness of landscape-level change is something that many models of inter-disciplinary and inter-stakeholder collaboration attempt to challenge by compressing the timeframes of interactions and using ‘fail fast’ methodologies. However, while these approaches can successfully accelerate processes, an accelerated process does not necessarily lead to systemic changes. Unless these processes are operating in a way that allows them to catalyse change in the complex systems of both the regime and landscape scales, they can effectively be seen as accelerating the maintenance of the status quo. This suggests that fundamental shifts at the landscape-level are not necessarily a question of time, but instead, some other form of inertia that is both resistant to change and able to change very quickly. For example, the Seneca effect describes how macro-economic growth is generally very slow, yet de-growth is generally very fast (Bardi 2011).

The concepts of inertia and momentum return to the discussion on resilience in section 2.4, but this link will be further developed through sections 2.7, 2.8, and 2.9. The next section unpacks this concept through the notion of Practice, exploring the ways in which Social Practice Theory can be linked with the concepts of Resilience, the sunk-cost effect, and societal-level behaviour change strategies.

2.7 Practice

Behaviour change strategies in the built environment can typically be categorized as either passive or punitive (Shove 2010). Passive strategies include town-hall type information sessions, pamphlets, and posters[10] while punitive measures punish poor behaviour typically through increased financial costs. Both of these strategies can be seen as relying on the deployment of resources after the design and construction of new developments, placing social change after technological development. These models are sharply criticized by Shove (2010) who suggests there is a need for a more complex behaviour change model that combines a variety of intrinsic and extrinsic motivations and rewards. To this end, Shove (2010) introduces the concept of Social Practice Theory as a framework for understanding and indeed changing behaviours relating to climate change.

The notion of Practice was flagged in the discussion on Social Innovation in section 2.5 where Howaldt et al.'s (2014) definition of Social innovation[11] in particular highlighted the role of practices.

Practice is a key element in the discussion on Social Innovation, and in a deeper understanding of MLP. Social Practice Theory or Practice Theory describes a branch of social and cultural theory that argue that practices, or the everyday socialised performance of habits and routines, are the primary units from which a society is built (Reckwitz 2002). Critically, theories of Practice focus on the relationship between social and cultural structures and the physical or technological world.

In a Practice-based approach to understanding behaviour, Practices rather than motivations or behaviours, becomes the primary unit of society. This contrasts with individually focused linear behaviour change theories like Ajizen's (1991) Theory of Planned Behaviour, which view the primary unit of society as individuals' choices.[12]

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[10] these will be described further in Chapter 5

[11] 'new combination or figuration (sic) of practices . . . with the goal of better coping with needs and problems than is possible by using existing practices' (Howaldt et al. 2014, p.9)

[12] This difference will be discussed in section 2.8

In setting out a framework for his version of Practice Theory, Reckwitz (2002) contrasts practice theory with classical philosophical understandings of culture and action. He describes how in the classical concept of *homo-economicus*, action results from individual desire, self-interest and an internalised logic, and in the concept of *homo-sociologicus,* action is driven by an innate desire to replicate culture through the establishment and maintenance of collective norms and shared values. Practice is not the first theory to contest these worldviews; Reckwitz (2002) highlights that in modernity and indeed post-modernity, the classical conceptions of the *homo-economicus*, and *homo-sociologicus* were challenged, with a variety of new forms of social and cultural theories based on complex relationships between both human and non-human factors emerging (Reckwitz 2002).

Although defining Practice in terms of how it is understood in this thesis, Reckwitz (2002) is not the first to describe practice. Instead, Reckwitz brings together the work on the subject of 'everyday action' from disparate authors including Bourdieu (1977), Giddens (1979, 1984), Foucault (1984), and Schatzki and Schatzki (1996). Reckwitz's argument is that although approaching the problem of theorizing practice from different positions, each of these authors was expanding beyond the aforementioned classical notions of human behaviour (2002). He argues that Practice Theory sits both within and alongside a broad spectrum of social and cultural theories, sharing a similar framework for understanding the structure of societies; it broadly focusses on how assemblages of actions and inputs (human and non-human) define the action and behaviour of individuals and communities (Reckwitz 2002).

In presenting his definition of Practice Theory, Reckwitz (2002) suggests that:

- forms of bodily activities
- forms of mental activities
- 'things' and their use
- a background knowledge or understanding
- know-how
- states of emotion, and
- motivational knowledge

combine to form a single unit of practice that could not exist without each of its component parts. Importantly, what this creates is a broad and overarching

framework with categorical rather than programmatic specificity that allows space for further exploration.

In the years since this work, a number of variants of practice theory have been developed. Within the many variations of practice theory however, there is a continuity in the defined components of practice with each referencing some or all of the following:

- bodily actions
- skills
- meanings
- instruments
- social interactions
- materials
- infrastructures, and
- social purposes (Jalas et al. 2017).

This analysis unsurprisingly correlates with Reckwitz's description of Practice Theory, but places perhaps more emphasis on the concept of 'things' by breaking this category down into instruments, materials, and infrastructures (Reckwitz 2002).

The ability of these variants to remain a cohesive theoretical grouping highlights the continuing significance of Social Practice Theory conceptually as a system-based framework rather than a defined set of components. This reinforces the argument that if a Practice is the base-unit of a society, these component parts do not function as social or cultural units in and of themselves, but instead rely on their combination within systems to form recognisable Practices.

In this thesis, Practice is being used as a framework for understanding societal transition and change. To this end, the model of Social Practice Theory described by Shove, Pantzar and Watson (2012) is used for the application of Practice Theory in this thesis.[13]

[13] Shove's (Shove, Pantzar & Watson 2012) version of Social Practice Theory can be criticised for its deliberate exclusion of individual agency, however, this is perhaps irrelevant in the context of a large-scale social learning approach because the exclusion of individual agency is problematic primarily when considering small-scale interventions (Jalas et al. 2017). At larger scales, the importance of individual agency and individual decision making is replaced by collective or cultural decision making, and the interplay between assemblages of Practices or systems of systems (Checkland 1981; Geels 2002; Meadows, DH 2008).

This version of Social Practice Theory is useful for proposing interventions in Practices because it reduces the components of Practice down to three key elements: meanings, materials and skills (Shove, Pantzar & Watson 2012). While this is one of the more reductive versions of practice theory, it provides a framework to conceive of a different kind of system-based change strategy that focusses on shared rather than individual attitudes, and incorporates physical objects, infrastructures, and systems, as well as knowledge and embedded 'know-how'.

Examining the question of interventions in the built environment to support actions to reduce GHG emissions through Shove's Social Practice Theory framework, the technologically driven efficiency arguments made by the IAE (International Energy Agency 2012), can be conceived as focusing on innovation in the material dimension while externalizing and automating rather than shifting the social (meanings) and knowledge-based (skills) dimensions (Manzini & Coad 2015; Stevenson, Baborska-Narozny & Chatterton 2016). As an example, the automation approaches described by Shaikh et al. (2014) could be argued to be unlikely to have a broad impact because they are not shifting community attitudes, nor building the community's knowledge and skills.

Addressing the meanings and skills dimensions of Social Practice Theory in projects in the built environment is a key focus in this thesis. One of the ways these dimensions interface with the co-creation processes that will be described in the case study chapters is through the concept of social learning.

Social learning is a process that has gained traction in the natural resource management literature, and can be broadly defined as learning through interaction with others (Rodela 2011). There are two elements in social learning: moral development and cognitive enhancement (Webler, Kastenholz & Renn 1995, p.445). These elements can be linked with the meanings (moral development) and skills (cognitive enhancement) dimensions of Social Practice Theory.

Rodela (2011) identifies three approaches to the facilitation of social learning: individual-centric, network-centric, and systems-centric. The facilitation of workshops that will be introduced as a part of this thesis is an important part of the individual-centric approach to social learning and provides a platform within which participants can experience both moral development and cognitive

enhancement (Webler, Kastenholz & Renn 1995).[14] This approach has been demonstrated through the work of the Parsons Design for Social Innovation and Sustainability (DESIS) Lab in New York where a design-led process is used to catalyse social learning and behaviour change (Penin 2013).

2.8 Other models of Transitions

Theories of Practice are emerging as a critical framework for understanding Sustainability Transitions, but there is still significant research and policy activity in this area that is utilising behaviour-change strategies rooted in the *homo-economicus* and *homo-sociologicus* worldviews. Shove (2010) highlights in particular the use of Ajzen's (1991) Theory of Planned Behaviour, Gatersleben and Vlek's (1997) conception of need, and Thaler, Sunstein and Leonard's (2008) Nudge theory. She sharply criticises the assumption that policies targeting society-level behaviour change should focus on individual behaviours and personal responsibility, going as far as suggesting that the use of these frameworks in policy has proliferated through mutual cross-referencing rather than evidence of their success (Shove 2010).

Although an oversimplification, the kinds of behaviour change envisaged by policies based on these theories make sense in the classical conceptions of society and culture. In these approaches, the disruption of individual attitudes and choices, often through 'nudges', is expected to lead to new societal norms by reaching a tipping point, and therefore bridge the three levels of MLP through the creation of a 'critical mass' (Ajzen 1991; Geels 2002; Gladwell 2006; Thaler, Sunstein & Leonard 2008).

There are two key areas for contention in this line of reasoning as it relates to the broad challenge of reducing the GHG emissions of the built environment that will be dealt with in the next two subsections. Firstly, the assumption that societal-scale GHG emissions should be an individual rather than collective responsibility, and secondly, the assumption that individual choices are a useful foundation for landscape-level changes.

[14] Interestingly, Webler, Kastenholz and Renn (1995) also suggest that social learning is based on processes rather than outcomes, something that will be further reflected on in section 4.4.

2.8.1 Individual responsibility for greenhouse gas emission reduction

The *homo-economicus* paradigm places individual motivations and desires at the centre of the formation of society. This effectively raises the influence of individual attitudes and choices above the influence of all other components of the socio-cultural and technological system.

One of the criticisms of applying this view is that individuals are only able to make decisions within their socio-cultural, technological, economic and environmental systems. This means that the options an individual is able to choose from are often determined by a higher level of the system (regime or landscape level). However, even if presented with what is broadly understood to be the best course of action, individuals may still choose to act against the communal good, and indeed against their own self-interest (Thaler, Sunstein & Leonard 2008).

This conundrum can be described as akrasia, and features in Plato's *Protagoras.* In this dialogue, Socrates suggests that people can knowingly act against their own self-interest if a more immediate interest is perceived to be of greater value. Aristotle's exploration of this phenomenon by contrast, shifts the reasoning beyond this notion of immediacy to position akrasia as a problem of comprehension rather than of decision making (Watson 1977, p.319). More contemporary explorations have further expanded on this conundrum, with Arkes and Blumer (1985) demonstrating significant irrationality in the psychology of decision making where investment had previously been made through what they termed the 'Sunk-Cost Effect'. The sunk cost was previously introduced in relation to increasing the resistance to change in a resilient system in section 2.4 and is a previous investment of money, time, effort, or other forms of value in a certain decision or path. The desire to realise the value of the original investment impedes decision making, often resulting in decisions that are not objective or economically rational (Arkes & Blumer 1985).

Returning briefly to the case of GHG emissions resulting from the built environment, these two positions would suggest an internal rationalisation that either the immediate benefits of continued growth in GHG emissions outweigh the longer-term consequences, or that the investments that have been made in the

current system preclude, or create the perception that it is prohibitively expensive to change course[15].

A Practice-based approach by contrast, acknowledges individual desires and motivations as one influence within a complex network. This allows influences such as communally held beliefs, regime and landscape level systems, as well as sunk-costs to be accounted for in the evaluation and description of systems.

2.8.2 Landscape level change

The second assumption in the focus on individual behaviour as a way of changing society-level behaviours is that the relationship between niche, regime and landscape level change is a question of volume; that is, that if enough people change a behaviour it will reach a tipping point where that behaviour becomes mainstream (Gladwell 2006). This is not how Geels (2002) describes the relationship between these levels, yet appears to be the general structure for macro-scale change within nudge theory and can be inferred in the application of the Theory of Planned Behaviour or the Trans-Theoretical Model of behaviour change (Ajzen 1991; Prochaska & DiClemente 1986; Thaler, Sunstein & Leonard 2008).

The assumption that individual actions will have rippling effects in the broader system is supported by Margaret Mead's (attributed) famous quote:

> never doubt the power of a small group of committed citizens to change the world; indeed it's the only thing that ever has' (Sommers & Dineen 1984).

However, a critical interrogation of this statement reveals that although radical shifts in the world may (all) have occurred as a result of action by small groups of citizens, not all of the actions of small groups of citizens result in changes to the world.

Rather than suggesting there is a disconnection or distinct separation between the niche and landscape levels in Geel's (2002) MLP, it can be observed that as innovations grow from the niche to the regime and landscape scales, they sometimes shift in form in response to broader sociotechnical influences. In the

[15] The term expensive is being used here in its broadest sense, describing social, cultural or political costs as well as economic.

sharing economy for example, businesses such as Airbnb, or Uber can be categorized as disruptors, entering into the market as informal businesses on the edge of or challenging the laws defined at the regime scale. As they grew out of the niche scale, into the regime scale, governments adapted their policies to give formal approval to the social innovations they were creating (in these cases, sharing goods and services with strangers). What is interesting however, is that as these sharing economy businesses grow from the niche scale into the regime and start to have an impact on the sociotechnical landscape, they can be seen to shift and become more like the services that they seek to replace.

For Airbnb, informal accommodation has become professionalised with user expectations of the experience becoming more and more like that of a traditional accommodation provider. This resulted in 2018 in the split of its offering into 'Airbnb' and 'Airbnb plus'. Airbnb plus brings a range of quality assurance measures to the experience, removing the need to trust a stranger who is advertising their space, and instead trust the Airbnb plus brand. Airbnb plus evaluates properties based on '100+ things that guests told us they love, from must-have amenities to the art on the walls' (AirBnB 2018). This range of features includes many that are closely related to the checklist in a hotel, from an iron and hairdryer, to towels, fluffy pillows, and hangers for clothes (AirBnB 2018). With this formalized infrastructure it is difficult then to differentiate between the end-user experience of an Airbnb plus listing and a hotel.

Similarly as Uber scales up in the ride-sharing area, it has begun to take on characteristics of the taxi industry with drivers shifting to working full-time rather than in their spare time, and passengers expecting a level of professionalism in the service (Sutton 2017).

While purely anecdotal in tone, these examples are perhaps an illustration of the problem with assuming that regime and landscape-level change is a question of scale and volume. They suggest, in line with Geels (2002), that there are other factors that start to shape these platforms as they reach the regime and landscape scales. It is these hidden factors that Social Practice Theory may be useful in helping to uncover.

2.9 Multi-Level Perspective based levels of Practices

An alternative to conceiving the regime and landscape levels as being defined by scale and volume, is suggested by Geels (2002) in the notion of sociotechnical assemblies. The concept of sociotechnical assemblies is closely aligned with Practices and enables a reconceptualisation of the minimal unit of society from the individual to a sociotechnical system.

This may appear counterintuitive as practices by definition are made up of individual attitudes, behaviours and choices. However, the relationship between Practices and sociotechnical systems presents an opportunity to think differently about the relationship between niche, regime and landscape scales. If the niche, regime and landscape levels can all be defined as assemblages of practices, the shift between these levels can be conceived through complexity and resilience rather than scale or volume.

This is described to some degree by Geels (2002) through the concept of nesting, but also draws on the concept of panarchy (Walker et al. 2004) to describe how practices and their component parts at the niche scale to be seen as simultaneously a part of this scale, and the regime and landscape scales. This conception is useful because it demonstrates how what may appear to be small changes in meanings, materials or skills at the niche scale may also have an effect at the regime and landscape scales.

In a review of projects addressing sustainable energy production, Jalas et al. (2017) cite a range of projects that have been successful to varying degrees at catalysing landscape-level changes through niche-scale action using Practice-based approaches. Many of these projects focus on engaging users in the design of low-carbon heating and electricity generation technologies, as well as investigating whether significant events (such as blackouts) trigger lasting changes in people's behaviours. Jalas et al. (2017) use Practice Theory as a way of framing desired shifts in socio-cultural and socio-technical systems toward more sustainable behaviours, and found that the destabilisation of existing practices is just as important as the establishment of new practices in facilitating landscape-level change.

Returning to the discussion on resilience in section 2.4, the process being described by Jalas et al. (2017) can be analysed in terms of Walker et al.'s (2004)

framework for measuring resilience. The ‘significant event’ shifts the existing system across a latitude threshold, overcoming the resistance to establish a new, although likely precarious state. Panarchy then describes how the inter-relationships between the various levels of practices (niche, regime and landscape) then influence how this new state functions (Walker et al. 2004).

2.10 Chapter summary

This chapter has established the built environment as a key site for action to combat the challenge of climate change. It has established the importance of linking technological development with social change and explored how shifting our understanding of the minimal unit of a society to be a practice rather than an individual desire or motivation can facilitate a deeper understanding of large-scale action. The chapter explored the notion of resilience and unpacked Geels’ (2002) Multi Level Perspective in the context of Social Practice Theory (Shove et al., 2012), tentatively describing a model of macro-scale change that is defined through the resilience of assemblages of practices rather than scale.

The next chapter will look specifically at how the concept of the Living Laboratory is being applied as a methodology to stimulate social and technological innovation before focusing specifically on the application of this model in the built environment through the Urban Living Laboratory.

Chapter 3 The [Urban] Living Laboratory

The previous chapter explored the relationship between technological innovation and social innovation in the context of tackling the Super Wicked Problem of climate change (Levin et al. 2012). It introduced Elizabeth Shove's version of Social Practice Theory (Shove, Pantzar & Watson 2012) and suggested that, in combination with Geel's Multi-Level Perspective (Geels, 2002) and conceptions of resilience (Vale 2014; Walker et al. 2004), it was a useful way of understanding society level behaviour change.

Projects in the built environment are easily linked with the materials dimension of Social Practice Theory but are arguably more difficult to link with the meanings and skills dimensions. Addressing these dimensions requires a way of situating projects in a context that can engage with the socio-cultural complexity of the real-world. Without this engagement with context, the meanings and skills dimensions of Social Practice risk becoming a question of post-innovation behaviour change, the problems of which were outlined in section 2.8. The living laboratory, as will be discussed in this chapter, is a model of action-research that provides a platform for sociotechnical innovation.

This chapter will begin by exploring the origins of the term living laboratory and the emergence of two distinct models of living laboratories: socially-oriented and technically-oriented. It then discusses a number of definitions of living

laboratories, and the emergence and role of the European Network of Living Laboratories (ENoLL) in shaping living laboratory research. The chapter then turns to the built environment, introducing the concepts of the Smart City, and the urban living laboratory.

A broad theme running through the chapter is the shift in understanding and definition of the living laboratory as a methodology. In particular, this chapter explores how the living laboratory began as a philosophical step outside of positivism, then became a method of facilitating complex multi-variant data collection, and finally emerged as a site for collaborative and engaged user-centric research.

3.1 The origins of the living laboratory

There are at least three starting points for the concept of the living laboratory identified in the literature. These are a shift within scientific research to become comfortable with unknown variables in the pursuit of knowledge in the eighteenth century, the creation of a dedicated physical space for the study of everyday behaviours in the 1990s, and the establishment of the European Network of Living Laboratories in 2006.

The term living laboratory was first coined by Gowin Knight in 1749 as a way of describing a model of scientific experiment that included the human body and its environment as variables (Knight 1749). This was a shift in the scientific method that would allow systems that were not fully understood (such as the human body) to be included in experiments. Knight's assumption was that cause-and-effect could still be observed despite the unknown complexity of the variables involved (Knight 1749). This was a critical step away from positivist experimental methods that attempted to control for all possible variables, and allowed a range of complex phenomena to be studied for the first time. While early medical research on the human body can be seen as being some distance from the way the living laboratory methodology is now understood, the acceptance of unknown variables remains a fundamental part of the living laboratory.

A more contemporary and more often cited starting point for the living laboratory is the Home Lab experiments led by Professor William Mitchell at MIT in the 1990s (Eriksson, Niitamo & Kulkki 2005). The most famous of the Home Lab experiments was the construction of a 1 000 square foot (93m^2) simulated home

environment called PlaceLab that housed people for extended periods of time in an environment filled with monitoring equipment and sensors. This gave researchers the ability to explore 'normal behaviour' while also collecting a wide range of data-points about this behaviour (Intille et al. 2006). Although this may appear to be a data-driven positivist approach, this builds on the work of Knight (1749) by acknowledging social interactions, and the psychology of decision making as uncontrolled variables within the system being studied.

The role of the participant or citizen in this form of living laboratory is to go about their daily life in as close to a normal manner as possible, giving researchers access to 'real-world data'. As sensor and monitoring technology has developed, this concept has pivoted to create distributed living laboratories where monitoring technology is taken into people's homes or workplaces rather than bringing people into technologically monitored spaces. This is considered to be a more accurate way of collecting data (Berry et al. 2014a), but still maintains the user as a passive participant that is being observed and studied. These approaches can be seen in a number of living laboratories around the world, including the early stages of the Adelaide Living Laboratory project that will be discussed in Chapter 7 (Robles et al. 2016).

A final starting point for the living laboratory is the establishment of the European Network of Living Labs (ENoLL) through the CoreLab project in 2006. The CoreLab project was funded by the European Commission under the Finnish Presidency of the European Union (Ballon & Schuurman 2015a). The project was aimed at

> promoting and coordinating a common European Innovation system for ICTs based on living labs and at hosting and promoting the establishment of the European Network of Living Labs (ENoLL) (Ballon & Schuurman 2015b, p.6).

Rather than viewing users as subjects to be studied, the founding principles of ENoLL treated users as partners in innovation processes through co-creative living laboratories (CORDIS 2008). Here, the living laboratory is an environment where researchers can engage with end-users and co-create innovations in a real-world or close-to real-world environment (European Commission 2009). This form of

engagement with end-users or citizens was not new, [16] but its inclusion in the living laboratory concept can be linked with the establishment of ENoLL.

3.2 Two models of living laboratory: The user as subject and the user as partner

Although the shift from the MIT PlaceLab to EnoLL's conception of the living laboratory may seem small, the relationship between researcher and participant was fundamentally changed; the participant moved from being considered a subject, to being considered a partner in the process (Ballon et al. 2015; Szebeko & Tan 2010). Although treating this as a binary between a user-as-subject and user-as-partner model may simplify the understanding of living laboratories, Sanders and Stappers (2008) suggest that these should be considered a continuum rather than discrete entities.

Franz (2014) also distinguishes between two types of living laboratories, but rather than differentiating through the role of the user, she differentiates through an orientation toward technical or social issues. Franz's (2014) work can be used to broadly link technically-oriented living laboratories with the MIT PlaceLab approach, and socially-oriented living laboratories with ENoLL's partnership approach. However, her work also suggests that most living laboratories, including those under the banner of ENoLL, are conceptually and methodologically entrenched in the physical sciences, undertaking technologically-focused research (Franz 2014).[17]

Franz (2014) suggests a differentiation between 'users' and 'citizens' in living laboratory research could be used to overcome the bias toward technological development. She suggests the term 'user' is strongly correlated with the notion of treating the user as a subject, while 'citizens' speaks to the notion of the user as a partner (Franz 2014).[18]

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[16] This can be traced to the participatory design and co-design movements that emerged in Scandinavia in the 1960s and 1970s. These will be discussed in Chapter 4.

[17] There are parallels in this observation and the discussion in section 2.3 about the role of technological and social research in reducing GHG emissions.

[18] The use of the term 'citizen' also has interesting consequences for urban living laboratories that will be discussed further in Chapter 5.

Regardless of the terminology being used, the need for researchers to shift from observing participants to collaborating with participants is well recognised. In a review of living laboratory practices, Salter and White (2013) conclude that although the term living laboratory may have gained popularity through the Home Lab projects at MIT, a (true) living laboratory requires users to actively participate in the co-creation of product and service innovations (Salter & White 2013).

This distinction can be found in much of the literature that informed the development of ENoLL. Eriksson, Niitamo and Kulkki (2005) for example dismiss the notion that a user-as-subject model like in the MIT PlaceLab should be considered a living laboratory. They suggest that in a living laboratory

> the basic idea is not about using the users as "ginny pigs" for experiments, it's about getting access to their ideas and knowledge (Eriksson, Niitamo & Kulkki 2005, p.3).

Frissen and Van Lieshout (2004) also highlight the importance of user partnerships. They define living laboratories as

> consciously constructed social environments in which the uncontrollable dynamics of everyday life are accepted as part of the innovation environment which enables designers and users to co-produce new products and services (Frissen & van Lieshout, 2004 in Schuurman et al., 2015, p.127).

This definition draws on elements of research practice that can be traced to Knight (1749), as well as some elements of William Mitchell's idea of a constructed environment but specifically references active user participation, and the social nature of the environment that was being created.

Pierson and Lievens (2005) highlight the critical importance of the social component of living laboratories. They state that living laboratories

> refer to facilities for designing, developing, testing and evaluating communication technologies and services in early stages of the innovation process by involving (early) users (Pierson & Lievens 2005, p.115).

Although the term 'early' here may be read as suggesting the importance of lead-users (Von Hippel 1976, 1986), Pierson and Lievens (2005) are describing involving users early in the process rather than involving early users. Their work also links social and technological development by situating living laboratories in the field of the Social Shaping of Technology (SST). From this SST lens, Pierson and Lievens (2005) view living laboratories as an organisational or methodological

approach whereby users are involved in an iterative design process[19], rather than as a prescriptive method for the development of a technology, product or service. Ballon, Pierson and Delaere (2005, p.15) also build on this notion suggesting living laboratories are 'experimentation environments in which technology is given shape in real life contexts and in which (end) users are considered 'co-producers''.

What is common across the definitions presented here is that users are involved in shaping the development of products and services. However, other than references to involving, and co-producing, the nature of their engagement is not made clear.[20]

The shift from the user-as-subject or technically focused model of PlaceLab to a user-as-partner or socially focused model advocated for by ENoLL was not immediate. In a review of living laboratory projects, Følstad (2008) found that more than half of living laboratory projects had no notion of user co-creation. This suggests many living laboratories registered within ENoLL did not conform to its definition of a living laboratory.

This led to an ongoing distinction being made between living laboratory projects that established a testbed for products or services, and those that supported what is described by Følstad (2008) as 'contextualized co-creation' with users. These findings are further reiterated by Mulder and Stappers (2009) who suggest that in living laboratories the focus is typically placed on the laboratory rather than living.

Since these criticisms, a number of authors have sought to provide more specific definitions and guidelines for living laboratories that can assist transitioning toward a user as partner model. Westerlund, Leminen and Habib (2018) for instance describe a process that is more open and less focused on specific products or services. They describe living laboratories as

> a sociotechnical platform with shared resources, collaboration framework and real-life context, which organizes its stakeholders into an innovation ecosystem that relies on representative governance, open-standards, and diverse activities and methods to gather, create, communicate, and deliver new knowledge, validated solutions,

[19] This notion of an iterative design process was described in section 2.5 through the work of Brown (2014) and Manzini and Coad (2015).

[20] The use of the term co-production rather than co-creation will be further discussed in Chapter 4.

> professional development, and social impact (Westerlund, Leminen & Habib 2018, pp.56-57).

These authors had previously defined living laboratories as

> physical regions or virtual realities, or interaction spaces, in which stakeholders from public-private-people partnerships (4Ps) of companies, public agencies, universities, users and other stakeholders, all collaborating for creation, prototyping, validating, and testing of new technologies, services, products and systems in real-life contexts (Leminen, Habib & Westerlund 2015, p.31).

This definition introduces four distinct elements:

1. The public-private-people partnership (4P)
2. A design-based approach to collaborative innovation
3. The blending of social and technological innovation, and
4. Defining success through multiple forms of value.

In the first element, the somewhat abstract concepts of user-driven innovation, or co-creation are translated into an explicit reference to partnerships between users, private companies and public institutions including universities and government departments. This collaboration is described by Leminen, Habib and Westerlund (2015) as the public-private-people partnership (4Ps) but it is often referred to as a quadruple helix (Arnkil et al. 2010).

The quadruple helix builds on the notion of the triple-helix of collaboration between academic institutions, government, and industry by including people or end-users as partners in the process (Arnkil et al. 2010). The quadruple helix model is perhaps easier to grasp than the 4Ps because as Hyysalo and Hakkarainen (2014) suggest, the metaphor conveys ‘an image of a (genetic) formula for effortless and joyful multiparty collaboration’ (Hyysalo & Hakkarainen 2014, p.206).

The second element makes a specific reference to a design-based process. This is closely aligned with the Design Thinking approaches that were described in Chapter 2 (Brown 2008; Brown & Wyatt 2010; Plattner, Meinel & Leifer 2012), as well as Mulgan’s and Manzini’s work on Social Innovation (Manzini 2007, 2010; Manzini & Coad 2015; Manzini & Rizzo 2011; Mulgan et al. 2007; Murray, Caulier-Grice & Mulgan 2010).

The third part of the definition (blending social and technological innovation) aligns with the need to address sociotechnical systems that was identified in

section 2.3. Rather than considering social innovation and technological innovation as separate challenges, the idea of blending establishes the living laboratory as a site for combining social and technological innovation.

The final part of the definition, the measures of success, begins to suggest that existing structures of understanding the value of collaborative processes may not be sufficient. This will not be dealt with here but will be returned to in a discussion on dialectic and dialogic models of co-creation in section 4.4, and in a discussion on value in section 5.8.

3.3 The European Network of Living Laboratories

As introduced in section 3.1, the European Network of Living Laboratories (ENoLL) was established in 2006 through the CoreLabs project. ENoLL describes itself as 'the international federation of benchmarked Living Labs in Europe and worldwide' (ENoLL 2019). Since its establishment, the membership has grown significantly, resulting in a rapid expansion in the number of projects formally deploying the living laboratory methodology (Sauer 2013). To date, more than 440 living laboratories have been recognised by ENoLL (ENoLL 2019).

Across the life of ENoLL, there has been a subtle shift in how it defines living laboratories. In 2009 ENoLL defined living laboratories as

> open innovation environments in real–life settings, in which user–driven innovation is integrated within the co-creation process of new services, products and infrastructures' (European Commission 2009, p.50).

In 2016 living laboratories were described as

> user-centred open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings' (ENoLL 2016).

These definitions will be discussed further in section 4.1.

Beneath ENoLL's high-level conceptualisation of the living laboratory, they define four primary types of living laboratories:

1. Research living labs that are focused on observing and understanding the innovation process
2. Corporate living labs that act as a venue for actors to come together to develop products or services
3. Organisational living labs that host internal innovation processes, and

4. Intermediary living labs that function as a connector between organisations and projects (Robles et al. 2015).[21]

These typologies are based on organisational structures rather than the function of the living laboratory. This assumes that the official definition and conceptualisation of the living laboratory is being adhered to by all members.

An alternate way of understanding the different ways in which a living laboratory can operate is to look to the kinds of challenges they are addressing. This approach builds on Franz's (2014) concept of technically and socially oriented living laboratories. The majority of early living laboratory projects within ENoLL were focused either on new product development in Information and Communication Technology (ICT) or other technologically focused industries, or on the development of Service Innovations in health (Sauer 2013). In her analysis of living laboratory thematic fields (reproduced as Figure 3.1 below), Sauer (2013) identified a focus on the development of multi-purpose ICT products (*n*=31), closely followed by living laboratories that focused on health and wellbeing (*n*=28). Relatively few living laboratory projects were identified that focused on Sustainability (*n*=8), while buildings, cities, and urban or built environments did not feature as categories (Sauer 2013).[22]

[21] These categories are not discrete and ENoLL acknowledges that a living laboratory can sit between categories or across multiple categories. Although there is a significant difference between these four typologies, as of 2018, there is not a requirement within ENoLL to define, nor even declare which type or types of living laboratory projects are being created. Instead, the divisions in ENoLL membership reflect the level of financial and administrative connection that a member is looking to have with the organisation (full members or adherent members).

[22] It is assumed that this omission may be due to ENoLL not including an urban or built-environment stream in its description of living laboratory foci at the time of Sauer's research rather than indicating that no research into cities was taking place. The City SDK project, for example, worked at the scale of cities, but because it was focused on the back-end software infrastructure required to support Smart City applications, it fell under a non-urban category.

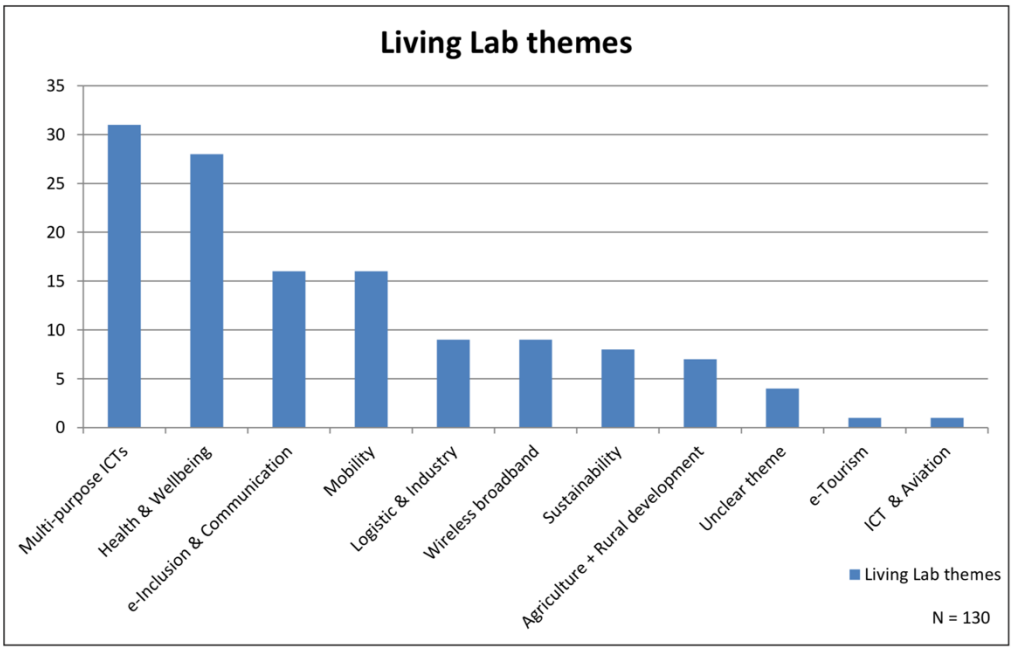

Figure 3.1: Living Lab themes (reproduced from Sauer 2013, p.59)

The remaining categories in Figure 3.1 appear to have less representation; however, if combining the categories that appear to focus on new product development, such as wireless broadband, e-inclusion and communication platforms, e-tourism, and ICT for aviation, another significant proportion (*n*=27) emerges.

This approach of grouping laboratories through the kinds of research outputs they were working toward rather than the overarching theme comes from the work of Richard Buchanan (Buchanan 2001). Buchanan (2001) suggests that four 'orders of design' or 'places' as he terms them can be defined:

- symbols
- things
- action, and
- thought.

In disciplinary terms, Buchanan (2001) notionally aligns symbols with Graphic Design, things with Industrial Design, action with Interaction Design, and thought with Environmental Design. Buchanan (2001) then links these orders of design with the scales at which they have impact, ranging from the very insular effects from the design of entire ecological systems at the scale of thought.

In terms of stakeholder complexity, Buchanan argues that the design of a single product or discrete service can take place in relative isolation while the 'design' of actions or thoughts is exponentially more complex, requiring the collaboration of many more stakeholders (Buchanan 2001). These levels of complexity begin to align with the notion of socially or technically oriented living laboratories as well as the user-as-subject and user-as-partner distinction (Franz 2014; Sanders & Stappers 2008).[23]

Applying this logic to the models of living laboratory described by ENoLL above (Robles et al. 2016), corporate and organisational living labs can be seen as being focused on the design of 'things' and 'actions', while intermediary living labs have the potential to branch into the design of 'thought' through the engagement of multiple stakeholder groups.

Where this analysis is particularly useful is in tracking the development of ENoLL's understanding of the categories of living laboratories. The majority of the ENoLL categories cited by Sauer (2013) in Figure 3.1 align with Buchanan's (2001) notion of 'things'. By contrast, the set of categories for defining living laboratory projects that have since been adopted by ENoLL (2018) (Figure 3.2 below) function at the higher level of Buchanan's (2001) orders of design.

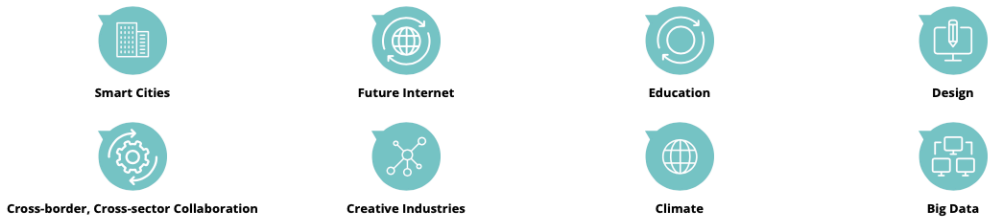

Figure 3.2: Categories of living laboratory projects (reproduced from ENoLL 2018)

[23] This also aligns closely with the concepts of Multi-Level Perspective and resilience described in section 2.9.

The change in the definition of these categories begins to suggest a shift from the living laboratory being considered a method for the design of a specific object or system, to a methodology for investigating more complex (higher-order) questions. The smart city theme described in Figure 3.2 is particularly interesting for this thesis because it provides a category that is closely linked with the built environment and with urban living laboratories.

3.3.1 Smart cities

Smart Cities has become a project category within ENoLL and houses a variety of research projects that are concerned with the collection and use of data relating to the built environment. The concept of the smart city emerged in the late 1990s, and, as with the living laboratory, there is not an accepted definition (Anthopoulos 2017). Instead, definitions range from the integration of ICT infrastructure into the physical form and function of cities (Neirotti et al. 2014), to the intelligence of institutions, companies and citizens and their ability to share and create knowledge (Komninos 2002). Table 3.1 below presents a small selection of these definitions.

Table 3.1: Selected Smart City definitions

Publication	Definition
Bakici et al. (2012 in Albino, Berardi & Dangelico 2015)	Smart city as a high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a sustainable, greener city, competitive and innovative commerce, and an increased life quality
Caragliu, Del Bo and Nijkamp (2011)	A city is smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance
Kourtit, Nijkamp and Arribas (2012)	Smart cities are the result of knowledge-intensive and creative strategies aiming at enhancing the socio-economic, ecological, logistic and competitive performance of cities
Nam and Pardo (2011)	A smart city infuses information into its physical infrastructure to improve conveniences, facilitate mobility, add efficiencies, conserve energy, improve the quality of air and water, identify problems and fix them quickly, recover rapidly from disasters, collect data to make better decisions, deploy resources effectively, and share data to enable collaboration across entities and domains.
Thite (2011)	Creative or smart city experiments [..] aimed at nurturing a creative economy through investment in quality of life which in turn attracts knowledge workers to live and work in smart cities. The nexus of competitive advantage has [...] shifted to those regions that can generate, retain, and attract the best talent
Zygiaris (2013)	A smart city is understood as a certain intellectual ability that addresses several innovative socio-technical and socio-economic aspects of growth

Within these definitions, there are a number of crossovers with the concepts of sustainability, social innovation, and living laboratories. Bakici et al. (2012 in Albino, Berardi & Dangelico 2015) present the smart city as an opportunity to drive sustainability, suggesting the smart city should be something of a sustainable panacea. Nam and Pardo (2011) also link the smart city with sustainability but in this case suggest that smart city data will drive sustainability through efficiency.[24] Kourtit, Nijkamp and Arribas (2012), Zygiaris (2013), Thite (2011) and Caragliu, Del Bo and Nijkamp (2011) also focus on efficiency, presenting the Smart City as a vehicle for attracting knowledge sector workers, and better understanding how to address the complex forces that can restrict the economic growth of a city.

Criticisms of smart city projects tend to suggest a need for something more akin to the Social Innovation approach described in section 2.3. Wolfram (2012), for example, suggests that to generate any significant benefit, smart cities need to attend to the social and cultural changes that are necessary to support what he characterises as the radical shifts required to enact a sustainable city agenda. Vanolo (2016) provides similar criticism, suggesting that people have been left out of the equation of smart cities, and that engagement with citizens is a critical part of developing future sustainable cities.

While smart city research is just one part of ENoLL's agenda, the challenges expressed in the smart city literature demonstrate the opportunity for the establishment of urban living laboratories that create an environment within which the link between social and technological innovation at the scale of the built environment can be investigated.

3.4 The Urban Living Laboratory

Since the establishment of ENoLL, a growing number of urban living laboratories have emerged that explore the systems and ecosystems of the built environment (Salter & White 2013; Sauer 2013). The concept has been embraced by both researchers and policy makers, seeing urban living laboratories as spaces that function as real-world test-beds for new-products, services and systems (Leminen, Habib & Westerlund 2015), and as spaces to co-create ideas and innovations (Ballon et al. 2015).

[24] The problems associated with this approach were discussed in section 2.3

Carina Borgström-Hansson, a senior policy advisor at the World Wildlife Fund, has been quoted as stating that

> today's sustainability challenges urgently call for new urban solutions which in turn require experimentation on suitable scales and with multiple stakeholders. This is where urban living labs have a key role to play. (Borgström-Hansson in McCormick & Christian 2017, p.5)

McCormick and Hartmann (2017) describe urban living laboratories as spaces for the development of new ideas and concepts, as well as for new forms of decision making and models of democracy. They also note however, that current applications are not leveraging the significant opportunity urban living laboratories present, suggesting most projects focus only on 'buildings, transport, and energy systems' (McCormick & Hartmann 2017, p.5). The alignment with traditional notions of product or service development perhaps demonstrates an assumption that an urban living laboratory is a living laboratory that is exploring urban issues or conducting projects that are applicable to the built environment, rather than being treated as a related and derivative, yet distinct methodological concept.

One of the distinctions that can be drawn between a living laboratory and an urban living laboratory is the type of 'user' they are engaging with. In their description of the quadruple-helix model of collaboration, Arnkil et al. (2010) broadly suggest that the people component should be linked with users of a product, service or system in order to engage in user-centred or user-driven innovation. However, in applying this concept to the built environment and urban living laboratories rather than living laboratories, notions of 'public interest' emerge (Yawson 2009). Yawson (2009) suggests innovations developed under the quadruple-helix model should focus on 'public interest', and therefore go beyond the more narrowly defined 'user' that is common in product and service innovation. This then connects with suggestions by Binder et al. (2015) and McCormick and Hartmann (2017) that urban living laboratories can be seen as spaces for experimenting with new models of democracy, and with Franz's (2014) distinction between users and citizens.

A number of other definitions and frameworks have emerged that have aimed to separate the urban living laboratory from the living laboratory and capture the increased complexity of urban living laboratory projects. An early definition of an urban living laboratory from within the ENoLL membership can be found in the MyNeighbourhood project that was introduced in sections 2.3 and 2.4 (Concilio et

al. 2013; Concilio, Puerari & Rizzo 2013). ENoLL describes this project as aiming to create

> a new and 'smarter' conception of the 'Smart City' that focuses on people and their well being (sic) rather than just ICT infrastructures and dashboards. In so doing, MyNeighbourhood uses new technologies and user data to help recreate a lost sense of neighbourhood that is rooted in local place, common ties and personal interaction (ENoLL 2018).

In describing the MyNeighbourhood concept, Barroca et al. (2013) suggest an urban living laboratory requires

- Situated solutions
- Engagement
- Social Innovation
- Collaborative services
- Enabling technologies, and
- Design thinking.

These elements are similar to those described in the definition of the living laboratory in section 3.3 and support the sociotechnical approach to innovation that was discussed in Chapter 2. There is also however, an emergent suggestion of a degree of geographic specificity and a notion of place through the notion of 'situated solutions'.

Barroca et al.'s (2013) definition is supported by the Governance in Urban Sustainability Transitions (GUST) project who define urban living laboratories as 'sites devised to design, test and learn from social and technical innovation in real time' (McCormick & Hartmann 2017, p.5). The GUST project suggests that an urban living laboratory should feature

- Geographical embeddedness
- Experimentation and learning
- Participation and user involvement
- Leadership and ownership
- Evaluation of actions and impact (McCormick & Hartmann 2017, p.7).

These five elements are closely aligned with the list used by Barroca et al. (2013) and provide a set of overarching principles for urban living laboratories. These principles will be expanded upon briefly here because they will be used later in this thesis to frame the discussion and evaluation of the case study projects.

Geographical embeddedness

Geographical embeddedness represents a shift away from the distributed social innovation concepts explored in section 2.5.2, acknowledging the geographic

specificity of community needs and attitudes. McCormick and Hartmann's suggestion that urban living laboratories are normally physical rather than virtual platforms differs significantly from the way networks of participation associated with living laboratories were described in 3.2 (McCormick & Hartmann 2017). This assertion is however supported by Frankova and Woodcock (2013) who suggest that for complex or geographically specific challenges such as those found in urban living laboratories, in-situ methods give greater opportunity for capturing and addressing the nuances of problems as they arise.

The use of the term embeddedness rather than specificity however, does allow the urban living laboratory to consider whether physical proximity, systemic impact, or both should be used to define the boundaries of user (stakeholder) participation. The 5000+ project described in the previous chapter, for example, used a blended approach of physical and virtual engagement and used different levels of geographic specificity to define stakeholder involvement. This will be picked up again in Chapter 5 in the discussion on how urban living laboratories interface with the existing participation frameworks of the built environment.

Experimentation and learning

The concept of experimentation may appear to support the user-as-subject or technically focused model of living laboratory, however, the inclusion of learning signals the importance of an urban living laboratory providing a platform in which communities of stakeholders (including users and professional groups) can develop specific skills as well as enhance their general understanding of the built environment. This links with the concept of social learning described in section 2.7 and aligns closely with the skills dimension of Social Practice Theory (Reed et al. 2010; Shove, Pantzar & Watson 2012).

Participation and user involvement

Participation and user involvement is a core part of the quadruple-helix model of innovation that is central to living laboratories and urban living laboratories (Arnkil et al. 2010). The specific mention of participation in the GUST description of urban living laboratories can be seen as reaffirming the commitment to the user as partner paradigm introduced in section 3.2 and a warning against developing monitoring-based projects with passive rather than active user involvement.

Leadership and ownership

McCormick and Hartmann (2017) describe leadership and ownership as being critical for the ongoing success of urban living laboratories. They suggest that leadership relates to the importance of having effective management and strong organisational capabilities, but can also be used to define different leadership structures within urban living laboratories. McCormick and Hartmann (2017) identify three types of urban living laboratories:

- strategic
- civic, and
- grassroots.

Strategic urban living laboratories are normally led by government or large private actors, civic urban living laboratories are normally led by universities, city governments, or developers, and grassroots urban living laboratories are normally led by existing community organisations (Bulkeley et al. 2018; McCormick & Hartmann 2017).

There are perhaps some similarities between these scales and the levels in Geels' Multi-Level Perspective (discussed in section 2.6). Strategic living laboratories can be seen as aligning with landscape-focused regime level actions, civic with the regime level, and grassroots with the niche level (Geels 2002). Combining the notions of Social Practice Theory, resilience, and Multi-Level Perspective (as per section 2.9) would therefore suggest a significant increase in complexity in strategic urban living laboratories as compared with that in a grassroots urban living laboratory.

The notion of ownership is not developed further in McCormick and Hartmann (2017) but can be read as being linked with resilience. Where ownership extends beyond an individual or organisation taking ownership and into notions of community ownership, the urban living laboratory may become more resilient through the establishment of more, and stronger social bonds (Pickett, Cadenasso & Grove 2004).[25]

[25] This process was partially described in the discussion on resilience in section 2.4 with resilience linked with the development of redundant capacity in a system.

Evaluation of actions and impact

The final element described of the GUST framework is the evaluation of actions and impact. This reinforces the importance of measuring experimentation and learning through impact as well as scientific or economic success. As an example, Webler, Kastenholz and Renn (1995) describes the way in which public learning can be embedded as a part of impact assessment, ensuring users and the general public are able to benefit from participating in urban living laboratory projects.

3.5 Urban Living Laboratories as an approach for urban renewal

In Australia, the kinds of projects in which a strategic-scale urban living laboratory can be established are often projects where a state or local government, rather than a private company, is developing an intra-urban site. These projects are often described as 'urban renewal', ‘infill development’, ‘urban consolidation’ or ‘urban regeneration’ because they consolidate the existing footprint of the built environment. There are a variety of scales at which this happens, ranging from the redevelopment of single parcels of land, to more coordinated development of multiple parcels of land within a precinct, and the larger scale redevelopment of land that was previously used for alternative (often industrial) purposes.

The reasons why some sites become sites for government led urban renewal and others are simply redeveloped by private enterprise helps explain why these kinds of sites often feature in urban living laboratories. A number of studies have reviewed this phenomenon in the Australian context, including Biddle et al. (2006), Trubka, Newman and Bilsborough (2008) and Newton et al. (2011). A consistent finding across these studies was that although intra-urban development has significant economic advantages, it can be difficult for private developers to realise this value. Biddle et al. (2006) and Trubka, Newman and Bilsborough (2008) both compared the relative costs of intra-urban and peri-urban development and concluded that although there may be a lower return on investment, there is a higher overall cost benefit in the development of intra-urban sites. In an analysis of the development of a single peri-urban block of land, Trubka, Newman and Bilsborough (2008) describe savings of AUD$85 000 (EUR €52 000) from the avoidance of the development of further capital infrastructure, and, a further AUD$250 000 (EUR €155 000) in savings in transport infrastructure costs over fifty-years. This latter saving is also explored by Biddle et al. (2006) who suggest intra-urban development can increase patronage and therefore the efficiency of

underutilized public transport infrastructure. These capital costs and benefits are often not included in a return on investment calculation by developers because many infrastructure development, operation, and associated maintenance costs are borne by governments, creating a split-incentive (Trubka, Newman & Bilsborough 2008).

Most social and environmental benefits of infill development have also been found to be predominantly realised in terms of a 'greater good' (Biddle et al. 2006). Societal benefits, such as demonstrating the positive experiential qualities of low-carbon development, or the avoidance of future social costs resulting from low-density development on urban fringes cannot easily be converted into specific forms of value by the development industry. Similarly, the environmental benefits of lowering the carbon impact of urban development by connecting with existing city infrastructure, or the rehabilitation of contaminated land can also be difficult for the development industry to quantify (Biddle et al. 2006).

One of the ways of dealing with this split-incentive is for governments to establish urban renewal bodies that can take a leadership role in the development of these sites. A selection of these bodies is summarized in Table 3.2 below.

Table 3.2: State and Territory Government-Based Urban Renewal Bodies in Australia as of January 2018

State	Urban Renewal Authority
ACT	City Renewal Authority
NSW	Urban Growth NSW Development Corporation
NT	-
QLD	Economic Development Queensland
SA	Renewal SA (Urban Renewal Authority)
Tas	-
Vic	Places Victoria (Urban Renewal Authority Victoria)
WA	Metropolitan Redevelopment Authority

These bodies are able to realise value that private developers often cannot and have been the main catalyst in Australia, to date, for the establishment of urban living laboratories. They typically focus on the conversion of ex-industrial or ex-commercial land into residential or mixed-use developments. However, there are also examples of these bodies developing greenfield sites in order to extend best-practice in the development industry.[26]

The rehabilitation of contaminated or 'brownfield' land demonstrates the importance of taking a sociotechnical approach in these developments. The United States Environment Protection Agency United States Environmental Protection Agency (2009) define brownfield sites as

> abandoned, idled, or under used industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas.

The assertion that contamination can be real or perceived makes the rehabilitation of contaminated land an interesting cross-over point between social and technological spheres of action. While various technologies or approaches can be used to physically rehabilitate land, the emotive nature of perception means that the perception of contamination can exist even when the physical contamination has been dealt with. It might be argued therefore that a brownfield site can require social as well as physical rehabilitation.

This returns to the differentiation between technologically led and socially led approaches to change described in section 2.3. Decision-based or linear theories such as the Theory of Planned Behaviour (Ajzen 1991) might respond to this challenge by focusing on convincing potential purchasers that the particular contamination they were perceiving to exist on the site had been dealt with in a satisfactory way. In this case, the behaviour change would occur due to a shift in attitude eliciting a desired choice. An approach based on Social Practice Theory (Shove, Pantzar & Watson 2012) by contrast, may instead focus on the underlying community attitude toward these kinds of brownfield developments (the meanings dimension) and rely on the development of trust in the community that the site was safe and healthy.

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[26] This includes projects such as Lochiel Park in South Australia (discussed in Chapter 7), and White Gum Valley in Western Australia.

3.6 Chapter Summary

This chapter introduced the concept of the living laboratory, tracing its history through three distinct conceptions. It began by exploring the concept of the living laboratory in the context of 18th century scientific research, where for the first-time variables that were in many ways unknown and could not be controlled were acknowledged and accepted within scientific research. The discussion then shifted to the late 20th century with the establishment of the technically oriented or user-as-subject model of living laboratory, and then finally to the socially oriented or user-as-partner model framed around the Social Innovation processes introduced in Chapter 2.

The chapter then introduced the European Network of Living Laboratories (ENoLL), and how the living laboratory has over time shifted from being a method for facilitating innovation and new product and service development, to a methodological framework through which a variety of 'big-picture' questions can be investigated, including the notion of Smart Cities.

The final section of this chapter explored the shift from living laboratories to urban living laboratories. It established a distinction between a living laboratory that is developing products and services for applications in urban environments, and an urban living laboratory that is using the built environment as a site for geographically specific explorations of social, cultural, environmental, and economic concerns. The next chapter will focus on unpacking the collaborative processes that are employed in living laboratories, in particular, the concept of co-creation.

Chapter 4 Co-creation

This chapter explores the concept of co-creation and its application in living laboratories. It begins by introducing co-creation in the context of the living laboratory and the urban living laboratory before turning to an exploration of some definitions of co-creation. It then explores the concepts of co-creation, co-design, and co-production, attempting to draw some distinctions between these terms.

From here, the chapter focuses on collaboration between professional disciplines, a core, yet not often discussed, feature of urban living laboratories. A number of models of disciplinary collaboration are discussed with particular focus on the relationship between these processes and the time taken to create new knowledge.

The chapter then uses the work of Richard Sennett (2012) to frame a discussion on a dialectic model of co-creation and a dialogic model of co-creation. These two models are then linked with the different models of living laboratory to demonstrate how co-creation can be applied philosophically as well as practically to living laboratory projects.

4.1 Context: co-creation in the urban living laboratory

The previous chapter introduced two descriptions of living laboratories that have been used by ENoLL (Box 1).

Box 1: An early and a more recent definition of the living laboratory from ENoLL

> Open innovation environments in real–life settings, in which user–driven innovation is integrated within the co-creation process of new services, products and infrastructures (European European Commission 2009, p.50).
>
> User-centred open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings (ENoLL 2016).

Both definitions feature the term co-creation with the first describing how user-driven innovation is integrated in a co-creation process, and the second placing co-creation more centrally in the operation of the living laboratory. Although co-creation is accepted as the methodology for engaging in quadruple helix collaborations within living laboratories (Arnkil et al. 2010), there is significant confusion and ambiguity in the definitions of exactly what co-creation means (Sauer 2013). Sauer (2013) suggests that the ambiguity and confusion surrounding the definition of co-creation in living laboratories has led to the user being treated as a passive subject despite on paper being highlighted as an important stakeholder and innovator.

The notion of 'innovation processes in real life communities and settings' (ENoLL 2016) is interesting for urban living laboratories because real life settings typically include complex arrays of professional disciplines as well as various end user communities. Living laboratory networks can be seen as being similar to, but more complex than, innovation networks (Nyström et al. 2014). Innovation networks have been documented as having eight key roles while living laboratory networks have up to 17 (Heikkinen et al. 2007; Nyström et al. 2014). These roles are defined by (Nyström et al. 2014) in a table that is reproduced as Table 4.1 below.

Table 4.1: Actor roles in living laboratories described by (Nyström et al. 2014, pp.491-92). Break in table indicates delineation between previously described and newly described roles (Nyström et al. 2014).

Role	Description
Webber	Acts as the initiator, decides on potential actors
Instigator	Influences actors' decision making processes
Gatekeeper	Possesses resources
Advocate	Background role, distributes information externally
Producer	Contributes to the development process
Planner	Participates in the development process; input in the form of intangible resources
Accessory provider	Self-motivated to promote its products, services, and expertise
Coordinator	Coordinates a group of participants
Builder	Establishes and promotes the emergence of close relationships between various participants in the living lab
Messenger	Forwards and disseminates information in the living lab network
Facilitator	Offers resources for the use of the network
Orchestrator	Guides and supports the network's activities and continuation; tries to establish trust in the network to boost collaboration which aims at the living lab's goals
Integrator	Integrates heterogeneous knowledge, development ideas, technologies, or outputs of different living lab actors into a functional entity
Informant	Brings users' knowledge, understanding, and opinions to the living lab
Tester	Tests innovation in (customers') real-life environments e.g. hospitals, student restaurants and classrooms
Contributor	Collaborates intensively with the other actors in the network to develop new products, services, processes or technologies
Co-creator	The user co-designs a service, product, or process together with the company's R&D team and the other living lab actors

The categories in Table 4.1 describe organisational roles within the living laboratory network rather than professional or disciplinary roles.[27] Professional disciplines are captured under the headings of 'producer', 'accessory provider', or 'contributor'. Interestingly, professional disciplines are not included as 'co-creators' The role of 'co-creator' is defined specifically as a role taken by users:

> Co-creator: The user co-designs a service, product, or process together with the company's R&D team and the other living lab actors (Nyström et al. 2014).

This is not problematic for living laboratories that focus on product or service innovation, but for urban living laboratories that are focused on the development of the built environment, it might be argued that there is a need for co-creation between professional disciplines.[28] The implication that co-creators are the users that collaborate with professionals may obscure a significant opportunity for understanding co-creation in urban living laboratories.

4.2 Defining co-creation

In a Red Paper on co-creating services in health for the UK Design Council, Cottam and Leadbeater (2004) provide an initial description of co-creation. They state that

> co-creation is not a one off event, like a referendum in which the community decides what should be done. Developing services that promote health will take more time. Nor is co-creation just a question of formal consultation in which professionals give users a chance to voice their views on a limited number of alternatives. It is a more creative and interactive process which challenges the views of all parties and seeks to combine professional and local expertise in new ways (Cottam & Leadbeater 2004, p.22).

The idea that co-creation is not just formal consultation and that it incorporates both professional and local expertise will be discussed further in Chapter 5. For this discussion, the important part of this definition is that co-creation is a process rather than an event. The process-focus also emerges in the European Commission's definition of co-creation processes in living laboratories. They link the living laboratory and co-creation with a design-led process, using the UK Design Council's definition of design to separate design as a verb from design as a

[27] This should not be read as a criticism and is unsurprising given the professional disciplines involved in a living laboratory project are related to the project requirements rather than the fact that it is being undertaken within a living laboratory.

[28] This will be returned to in section 4.3

noun.[29] This understanding of co-creation as a verb is critical for living laboratories that seek to function in the user-as-partner model introduced in section 3.2. This is because they are based on the processes that take place, rather than the outcomes that are produced (European Commission 2009; Steen 2011).[30]

The stipulation of a design-led process by the European Commission is taken further by Chathoth et al. (2013), Dutilleul, Birrer and Mensink (2010), and Mulder and Stappers (2009) who focus on documenting specific methods and processes associated with co-creation. Ind and Coates (2013) however, push back against this approach, describing the broad range of ways in which co-creation is applied as an asset rather than a liability. They suggest that the relative lack of definitional specificity allows for methodological flexibility, and that co-creation should be conceived as an open and creative practice rather than a process to achieve a prescribed outcome (Ind & Coates 2013). Sanders and Stappers (2008, p.6) also define co-creation very broadly, suggesting that it is an 'act of collective creativity, i.e. creativity that is shared by two or more people'.

User engagement in design-based processes is not unique to co-creation. The terms co-design and co-production are also used to refer to an ongoing and iterative process that engages end-users in a design or in the creation of an innovation beyond the concept design stage (Botero & Hyysalo 2013; Hyysalo & Hakkarainen 2014; Ind & Coates 2013; Sanders & Stappers 2008).

The term co-design emerged from the Participatory Design movement in the 1960s and is very commonly used to describe collaborative design-led processes. Today, a key journal publishing co-creation and living laboratory literature is titled *Co-design.* Sanders and Stappers (2008, p.6) link the concepts of co-design and co-creation by suggesting that 'co-design is a specific instance of co-creation'. In defining co-design they state that

> We use co-design . . . to refer to the creativity of designers and people not trained in design working together in the design development process (Sanders & Stappers 2008, p.6).

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[29] 'Good design is a verb, not just a noun. It is a sequence of steps that defines problems, discovers solutions and makes them real' (UK Design Council in European Commission 2009, p.10).

[30] This also connects with the notions of social innovation and social learning introduced in Chapter 2, as well as best practice in citizen engagement which will be discussed in Chapter 5.

This suggests that Sanders and Stappers (2008) see co-creation as an overarching methodological approach and co-design as specific moments of collaboration.

In 2017, when discussing the future role of architects and other professions related to the built environment, the World Economic Forum (WEF) stated that

> for the cities of tomorrow, collaboration as well as co-creation and co-design capabilities are 'the new "must have" competences (World Economic Forum 2017, p.58).

The combination of co-creation and co-design here suggests that although the WEF do not explain the distinction between the two terms, they see enough difference between co-creation and co-design to list them as independent processes.

The WEF also use the term co-production in some publications. A search in July 2018 of the WEF's website finds 126 results for the term 'co-creation', 101 results for 'co-design', and 19 results for 'co-production' (World Economic Forum 2018). Co-production was also recently used to frame a special edition of *Building Research and Information* (Stevenson & Petrescu 2016), but the editors do not clarify why the term 'co-production' was preferenced over other terminology.

The definitions presented in this section begin to describe the co-creation process, but, other than the nesting approach by Sanders and Stappers (2008), do not distinguish between the terms co-design, co-creation and co-production. The subsection that follows will explore co-design, co-creation, and co-production in more detail to attempt to draw some distinctions between these terms.

4.2.1 Separating co-creation, co-design, and co-production

The interchangeability of the terms co-creation, co-design and co-production is problematic when trying to define what co-creation means for this thesis. To this end, this section will focus on differentiating between co-design, co-creation and co-production. It will use an etymological analysis and a discourse approach to unpack these terms before turning to the work of Chathoth et al. (2013) to distinguish particularly between co-creation and co-production.

The prefix *co-* is derived from the Latin *com*, referring to an element of togetherness. This suggests an element of physical or intellectual proximity in collaboration. This is quite different from the crowdsourcing approaches described in section 2.5.

The terms create, design and produce bring a variety of definitional distinctions to the discussion. The definitions of these three terms from the *Macquarie Australian Dictionary* (Macquarie Library & Butler 2009) and the *Oxford English Dictionary* (Simpson & Weiner 1989) are presented in Table 4.2 below.

Table 4.2: Definitions of create, design and produce from the Macquarie Australian Dictionary[a] (Macquarie Library & Butler 2009) and the Oxford English Dictionary[b] (Simpson & Weiner 1989)

	Create	**Design**	**Produce**
Definition 1	1. To bring into being; cause to exist; produce[a]	1. To prepare the preliminary sketch or the plans for (a work to be executed)[a]	1. To bring into existence; give rise to; cause[a]
	1. To cause to come into existence[b]	1. To work out the structure or form of (something), as by making a sketch, outline, pattern, or plans[b]	1. To bring (something) into existence; yield[b]
Definition 2		"2. To plan and make (something) artistically or skilfully[b]	2. To bring forth (a product) by mental or physical effort; make[b]
Origin	Latin: *Creare* bring into being[a] to produce[b]	Latin: *Designare* mark out[a,b]	Latin: *Producere* lead or bring forward, extend, prolong, bring forth, produce[a] to bring forward[b]

What appears in the definitions of 'design' is that design is a process that occurs prior to the act of bringing something into being. The Latin *designare* is translated as 'mark out', implying that 'design' is a process that takes place in a different temporal context to, and in preparation for, an action. This is further reinforced in Giacomin (2014) who describes 'design' as expressing intention rather than application.[31] 'Create' and 'produce' by contrast are defined as bringing something into being.

In order to separate between co-creation and co-production therefore, a different approach is required. Discourse analysis suggests that rather than a top-down or definitional approach, a bottom-up or cultural approach can be used to explore the

[31] This gives design a similar role to that which Butler (2002) and Foucault (2002) ascribe to postmodern discourse, i.e. expressing intention rather than application.

meanings of terms (Gee 2004). This approach allows emergent semantic shifts to be explored, that is, disconnects between a technical definition and a culturally shared meaning (Blank 1999). This review was unable to locate research into the specific cultural and semantic associations of the terms co-creation and co-production. However, it might be argued that the semantic relationship of create to creation and creativity suggests a process that is reliant on expertise assumed to be held by "creatives" or design professionals. This assumption may then bias the use of the term co-creation to be seen as relating to a design-based process that is led by "creatives". By contrast, the cultural relationship of produce to production and mass-production may be seen to suggest a connection with manufacturing. The etymology and definitions of production and manufacturing differ significantly, but there is perhaps a link through the term *manufactory*, which relates to a place of craft-based hand making and production (Simpson & Weiner 1989).[32]

Turning to the business management literature, Payne, Storbacka and Frow (2008) and Vargo and Lusch (2004) suggest that the terms co-creation and co-production should be interchangeable; however, Chathoth et al. (2013) establish a distinction between co-creation and co-production. Payne, Storbacka and Frow (2008) frame co-creation or co-production as a cornerstone of value generation in a service-based economy, arguing that value is co-created or co-produced because it can only exist if users are participating by accessing a service.[33] By contrast, Chathoth et al. (2013) define this process specifically as the co-production of value. They argue that because users are not able to participate in the creation or customisation of products or services, they are not co-creators (Chathoth et al. 2013). Their summary of the differences between co-production and co-creation is reproduced as Table 4.3 below.

[32] There is an interesting link here with the concept of the Design Factory, established at Aalto University in 2008 (Design Factory at Aalto 2018; Design Factory Global Network 2018). Although not specifically addressing engagement with end-users, the description of the Aalto Design Factory is that it is 'an interdisciplinary product design and learning hub uniting students, teachers, researchers, and industry' (Design Factory at Aalto 2018). This use of the term is in many ways returning to the concept of the *manufactory,* but it is assumed, given the scale of the Design Factory Global Network in comparison to production-focused factories, that this is not the culturally dominant understanding of the term.

[33] Theories of value will be further explored in section 5.8

Table 4.3: Comparing co-creation with co-production (reproduced from Chathoth et al. 2013, p.15)

	Co-production	**Co-creation**
Value creation	Extraction of economic value Quality of products and services	Creation of unique personalised experiences
Customers' role	Passive (rely on the physical environment provided) Perceived as a resource	Active (provide input to service provider before, during, and after the service) Information provider Value creator
Customers' participation	Mainly at the end of the value chain	Repeated interactions and transactions across multiple channels Serves as an operant resource
Customers' expectations	Suit their needs to what is available	Co-create products and services with customers
Key actors	Managers and employees	Customers, managers and employees
Focus	Production and company centric	Customer and experience centric Engaging customers High level of information processing
Innovation	Led by the firm	Co-innovate and co-design with customers Learning from customers (opinion leaders and trendsetters) and the process
Communication	Listening to customers Less transparent	Ongoing dialogue with customers Open and transparent communication

Source: Dellande et al. (2004), Friesen (2001), Grönroos (2008), Lusch and Vargo (2006), Payne et al. (2008), Prahalad and Ramaswamy (2004a, b), Vargo and Lusch (2008a), Xie et al. (2008).

Many of the concepts listed under co-creation in Table 4.3 have strong correlations with the ambitions of living laboratories. In particular, the distinction between the customers' role in the two processes is interesting in the context of the user-as-subject and user-as-partner models of living laboratories described in section 3.2 (Ballon et al. 2015; Szebeko & Tan 2010). The descriptions of a co-production process in Table 4.3 can be seen to align with the user-as-subject model of living laboratory while the descriptions of a co-creation process align more closely with the user-as-partner model of living laboratory.

The shift in user involvement from the end of the product or service development cycle in co-production, to acting as a resource across all stages of the process in co-creation suggests that the co-production model considers users primarily as consumers. This understanding of co-production creates a significant problem in the context of the previously discussed literature that uses the term co-production rather than co-creation (see for example Krzywoszynska et al. 2016; McCormick & Hartmann 2017; Stevenson, Baborska-Narozny & Chatterton 2016; Stevenson & Petrescu 2016).

4.3 Collaboration between professional disciplines

In section 4.1, a distinction was drawn between living laboratories and urban living laboratories through the number of professional disciplines that may be expected to collaborate in the co-creation of projects. It was suggested in living laboratories that focused on product or service design, there was likely to be a smaller number of professional disciplines involved than in urban laboratory projects that focus on the built environment.

This section explores the concept of co-creation through the lens of collaboration between professional disciplines. It introduces the concepts of intradisciplinary, crossdisciplinary, multidisciplinary, interdisciplinary, and transdisciplinary collaboration, before discussing the role of collaboration between professional disciplines as a way of accelerating knowledge sharing and innovation. A series of historical examples of collaborations that cross traditional disciplinary boundaries are then presented to suggest why collaboration between different disciplines continues to be seen as an important part of innovation.

The living laboratories literature discussed in Chapter 3 traced the living laboratory approach (and therefore co-creation) through the emergence of

collaboration between professionals and end-users. The historical developments presented traced the history of living laboratories from Participatory Design in Scandinavia in the 1960s, through cooperative design in the 1970s, social experiments of the 1980s, digital city initiatives of the 1990s and home labs of the 2000s (Robles et al. 2016).

The limitation of this approach is that it traces the history of the co-creation process only through end-user engagement in the development of products and services. The emergence of the kinds of interdisciplinary professional collaboration that are required in more complex living laboratory projects, particularly those associated with urban living laboratories, is not addressed by these analyses.

The terms intradisciplinary, multidisciplinary, crossdisciplinary, interdisciplinary, and transdisciplinary are often used interchangeably, but each term is associated with a specific meaning and set of processes and practices (Stember 1991). A summary of the descriptions of these terms by Stember (1991) and Stock and Burton (2011) is provided in Table 4.4 below.

Table 4.4: Descriptions of intradisciplinary, multidisciplinary, crossdisciplinary, interdisciplinary, and transdisciplinary collaboration in Stember (1991) and Stock and Burton (2011)

Term	Description
Intradisciplinary	Work that takes place within a single discipline
Crossdisciplinary	A disciplinary expert using their knowledge to explain a phenomenon or concept in another discipline; or, using their understanding of another discipline to explain an element in their own discipline
Multidisciplinary	Multiple disciplines providing perspectives on an issue or problem but relying on a third-party to integrate the knowledge and draw conclusions based on these perspectives
Interdisciplinary	A problem-based exploration where the contributions of several disciplines are integrated to find a solution
Transdisciplinary	The development of a new intellectual framework that creates a new discipline

A way of further understanding the differences between these terms may be in the ways in which disciplinary boundaries are crossed. In both the crossdisciplinary and multidisciplinary approaches, the disciplinary boundaries are crossed through an individual's choice or serendipitous exchange. By contrast, in both interdisciplinary and transdisciplinary collaboration, boundaries are deliberately crossed through a formalized process of exchange (Stember 1991; Stock & Burton 2011).

There is a subtle difference in the way that Stember (1991) and Stock and Burton (2011) define transdisciplinary collaboration. Stember (1991) describes the establishment of a new discipline that is based on two or more previously described disciplines,[34] while Stock and Burton (2011) suggest that transdisciplinary collaboration not only includes multiple academic disciplines, but also non-academic disciplines including users.[35]

For Stember (1991) the process of shifting between interdisciplinary and transdisciplinary collaboration would appear to be a shift from discrete (problem-based) collaboration to some form of continuous (ongoing) collaboration that under the right circumstances may define a new discipline. In cases where a new discipline did not form, or in the intermediate time between establishing an ongoing working relationship and the definition of a new discipline, the process would therefore be caught between being termed interdisciplinary and transdisciplinary (Stember 1991).

In the context of discrete versus continuous collaboration, the participatory approaches used by Stock and Burton (2011) to define transdisciplinarity can be argued to be possible in either interdisciplinary or transdisciplinary collaboration. In combining the two models, the defining factor would therefore not be whether users are involved, but instead whether they are involved in discrete projects or in a more continuous way. This again returns to the concepts of the user-as-subject (discrete) and user-as-partner (continuous) models of the living laboratory.

[34] Examples of this include neuro-psychology, bio-informatics, and urban-informatics.

[35] This can be seen as being similar to the quadruple-helix model championed by living laboratories (Arnkil et al. 2010)

4.3.1 Intradisciplinary, crossdisciplinary and multidisciplinary collaboration

When exploring examples of professional collaboration, perhaps one of the most famous examples is the laboratories of Thomas Edison. The Edison Laboratories were established in 1887 and employed large teams of engineers who worked collaboratively to find commercial applications for the myriad of new technological discoveries brought about by the industrial revolution. Most of the innovations from Edison's laboratories however, were based on engineers collaborating to connect ideas from their previous professional experiences (Hargadon & Sutton 1997). As Hargadon and Sutton (1997) show, much of this occurred within the engineers' disciplinary boundaries (intradisciplinary), or by applying their knowledge in another closely related discipline (crossdisciplinary).

Crossdisciplinary thinkers, or polymaths were not a new concept in the Edison Laboratories. Many renaissance figures, including Leonardo da Vinci and Galileo Galilei, demonstrate the ability of polymaths to synthesise their expertise across a number of sometimes disparate disciplines (Terjesen & Politis 2015). Crossdisciplinary expertise has also led to significant breakthroughs in the twentieth century. Most Nobel Prize winners for example, can be linked with crossdisciplinary work (Root-Bernstein 2003, p.268).

Examples of multidisciplinary work approaches are a little harder to identify historically, because the information exchanges are often informal and therefore not recorded (Stock & Burton 2011). However, an interesting example of how multidisciplinary knowledge is exchanged can be seen in the subtitles of *The Builder* magazine published in London from 1843 until 1966. Table 4.5 presents a summary of the changes in the subtitles of *The Builder* between 1843 and 1870.

Table 4.5: Subtitles of *The Builder* magazine from 1843 – 1870

Year	Subtitle
1843	An illustrated weekly magazine for the drawing-room, the studio, the office, the workshop, and the cottage
1846	An illustrated magazine for the architect, engineer, operative, and artist
1851	An illustrated magazine for the architect, engineer, archaeologist, operative, and artist
1863	An illustrated magazine for the architect, engineer, archaeologist, constructor, sanitary reformer, and art-lover
1870	An illustrated magazine for the architect, engineer, operative, and artist

The shift in focus to include sanitary reformers can be aligned with the knowledge sharing of responses to the global cholera pandemic, demonstrating how periodicals or multidisciplinary journals can help disciplines to share knowledge rather than relying on individuals to undertake crossdisciplinary research. While not instigating collaboration, the presence of articles from multiple disciplines around a central theme, allowed information to traverse disciplinary boundaries more quickly than it may have otherwise, satisfying the needs of both crossdisciplinary thinkers and multi-disciplinary teams.

4.3.2 Interdisciplinary and transdisciplinary collaboration

Formal models of interdisciplinary and transdisciplinary collaboration emerged largely after World War II (National Academy of Sciences 2005). Table 4.6 presents a number of examples of interdisciplinary and transdisciplinary collaboration, blending the work of the National Academy of Sciences (2005), Turner (2010), Sennett (2012) and others to present a series of examples. These examples are not intended to be a definitive list and have instead been selected because they are illustrative of the emergence of interdisciplinary and transdisciplinary team and work environments. A series of key conceptual developments have also been added to Table 4.6 that provide reference points for the timeline from the co-creation and living laboratory literature.

Table 4.6: Timeline of key precedents for collaboration, co-creation and living laboratories

Decade	Key projects		Key conceptual developments
1940s	1940 – 1946 – 1957 Radiation Laboratory (RadLab) / Research Laboratory of Electronics (RLE)	1942 – 1946 Manhattan Project	
1950s	1951 – 1963 SAGE Air Defence Lab		Focus-group methodology
1960s	1967 – 1985 Architecture Machine Group	1960s Bell Laboratories (commenced significant interdisciplinary research)	Participatory Design (PD)
1970s	1974 –2000 Electronic Information Exchange System (EIES)	1970 – Xerox PARC	Co-Design
1980s	1985 - MIT Media Lab Including Home Lab experiments in 1990s and 2000s	1985 – Whole Earth 'Lectronic Link	
1990s			Human Centred Design
2000s	2006 – European Network of Living Labs (ENoLL)	2008 – Design Factory at Aalto	Living Laboratories

The Radiation Laboratory (Rad Lab) and Manhattan Project are regarded as being the earliest example of formal interdisciplinary collaboration (Fleischer 1991; National Academy of Sciences 2005). These projects, funded by the United States Government Defence Department, developed microwave radar systems, and nuclear weaponry respectively and required collaboration between military strategists, academic researchers, and industrial manufacturing companies. Fleischer (1991, p.1) describes the RadLab as

> an innovative partnership that was taking shape between academic, industry, and the government; and the new cooperation that was evolving between physicists, engineers, and other scientists from different academic backgrounds. These fledgling bonds would transform scientific research and how it would be carried out in the future.

This statement highlights the transformational nature of the shift to interdisciplinary work, as well as the partnership between academia, industry and government that would go on to become known as the triple helix model of innovation (Arnkil et al. 2010). The novelty of interdisciplinary collaboration in the Radiation Laboratory is also supported by colloquial accounts of the Manhattan Project that was occurring at the same time documented by Professor Richard Feynman (Feynman 2010). These accounts highlight the unique nature of this collaboration, including the need for (and the difficulties associated with) having the various branches of scientific research working together on a common goal (Feynman 2010).

The Research Laboratory of Electronics (RLE) that emerged from the RadLab project had two distinct tracks of research: physics and communications. The physics track used traditional intradisciplinary research to apply the knowledge about microwaves that had been developed in the RadLab project to explore questions about the nature of the universe. In the communications track however, deliberately interdisciplinary teams were assembled that included electrical engineers, linguists, neurophysiologists, psychologists, and more to explore new ideas in communications (Wiener et al. 1997).

The projects in the RLE were focused on interdisciplinary collaboration between various branches of science, but the need to obtain feedback from users was also recognized. Director Norbert Weiner actively promoted the idea that feedback needed to be sought from users[36] because in his words

> the top officials may find that they have based their policy on a complete misconception of the facts that their underlings possess (Weiner 1950, p.49 in Turner 2008, p.23).

Through the 1950s, research teams at the RLE developed many of the concepts that were influential in later digital communications (Fleischer 1991), and catalysed a shift toward the development of transdisciplinary working groups at MIT. The success of the RadLab and RLE led to the establishment of various other interdisciplinary research laboratories at MIT through the 1950s and 60s including

[36] Because of the technological proficiency required to operate the kinds of products that were being developed in the RLE, ‘users’ were generally professionals that would be using the technologies as a part of their often highly-skilled vocation.

the SAGE Air Defence Lab, and Nicholas Negroponte's Architecture Machine Group.

The Architecture Machine Group took the concept of interdisciplinary working groups further than the RLE, establishing a very broad remit of developing new approaches to human-computer interactions. This was a significant shift in the goal of interdisciplinarity, exploring questions rather than hypotheses, and pushing the researchers toward becoming transdisciplinary working groups that collaborated over longer time periods and on multiple challenges. Interestingly, the development of these working groups was occurring at the same time as the Participatory Design and Co-design movements were emerging in Scandinavia.

Outside of the university sector, commercial research and development laboratories in the USA also began to shift toward interdisciplinary research teams, with Bell laboratories shifting from intradisciplinary research projects to interdisciplinary research teams in the 1960s, and the establishment of Xerox Parc in 1970 (Brand 1987).[37]

Distributed interdisciplinary networks, that is, interdisciplinary networks where teams are connected through communications technologies rather than physical proximity, took a little longer to emerge because they were reliant on many of the digital communications technologies that developed in the 1970s. In 1975, the EIES was developed, enabling individuals to begin to share information in near real-time to distributed and interdisciplinary networks. This system is particularly interesting, because it functioned as an online forum that brought together industry, government and academia around specific topics of interest. This reinforced the concept of bringing together interdisciplinary teams to discuss problems and ideas rather than specific technologies, reinforcing the shift from professional and academic silos toward more open and collaborative networks (Brand 1987). Ten years later, in 1985, the Whole Earth 'Lectronic Link (WELL), an early version of the World Wide Web, allowed distributed networks of individuals to realise the power of interdisciplinary information exchange and

[37] These research centres are responsible for a tremendous number of innovations in the computer and telecommunications industries and assembled numerous interdisciplinary and transdisciplinary working groups (Brand 1987).

collaboration. Also in 1985, the Architecture Machine Group broadened to become the MIT Media Lab.

The Media Lab expanded on the work of the Architecture Machine Group, encouraging students and researchers from a broad range of academic disciplines to work together to develop innovative ideas.[38] The Media Lab describes itself as "antidisciplinary" (MIT Media Lab 2012), but can be seen as functioning in both an interdisciplinary and transdisciplinary manner. According to Stock and Burton's (2011) definition, the arms-length relationship with commercialisation and user-testing would suggest an interdisciplinary classification, but the focus on assembling groups together to explore themes rather than problems satisfies Stember's (1991) definition of transdisciplinarity. Interestingly, the Media Lab's inclusion of users but exclusion of commercialisation is an interesting example of treating the user as a partner rather than a consumer (Ballon et al. 2015; Brand 1987; Szebeko & Tan 2010).

4.3.3 The role of time in driving interdisciplinary collaboration

In order to explain why co-creation and the urban living laboratory are being looked to as a way of addressing climate change, the dimension of time (urgency) that is associated with super wicked problems is critical (Levin et al. 2012).

The crossdisciplinary approach is characterised by individually motivated and directed explorations of crossovers between disciplines and can be assumed to take place over relatively long timescales. In a multidisciplinary approach, information is also assumed to be shared between disciplines at a relatively slow pace, through informal exchanges within multidisciplinary projects, or in multidisciplinary academic or non-academic journals (Stock & Burton 2011).

By contrast, interdisciplinary and transdisciplinary approaches assemble groups of researchers around a problem, allowing exchanges (both formal and informal) to take place at an accelerated rate. The establishment of an ongoing working relationship between various disciplines in a transdisciplinary approach is assumed to be associated with increased crossdisciplinary understanding by individuals,

[38] The Media Lab housed the HomeLab experiments of William Mitchell that were described in section 3.1.

further reducing the time required for information to filter across disciplines (Stock & Burton 2011).

The relative closeness of disciplines in these models is described in Figure 4.1 below. This figure adapts the work of Jensenius (2012), using proximity to show the way in which information exchanges take place and to highlight the process of discipline formation described by Stember (1991).

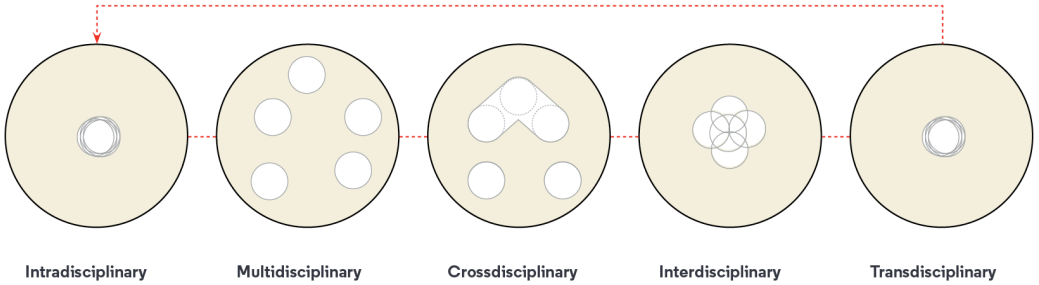


Figure 4.1: Disciplinarities: intra, multi, cross, inter, and trans (adapted from Jensenius 2012)

It could be argued that over a long enough timescale, information would pass across disciplines regardless of which collaboration model is in place. However, in addressing challenges where time is a critical element, interdisciplinary and transdisciplinary approaches can be seen as accelerating solutions. This was seen in military projects described above, and can be translated through concepts like urban living laboratories to the challenge of super wicked problems (Levin et al. 2012).

4.3.4 Collaboration in the built environment

The case for interdisciplinary and transdisciplinary collaboration in the built environment goes beyond developing models to address GHG emissions. There are a number of opportunities where these kinds of collaborative approaches may have significant benefits.

Projects in the built environment require collaboration between various disciplines including urban planners, architects, engineers, construction managers, plumbers, carpenters and electricians. These disciplines must work together to design and

construct a building or urban environment. Although this collaboration happens, the World Building Council for Sustainable Development describe the process as functioning through operational islands. This means the various stakeholders often work in isolation, and, different stages of projects are executed in isolation (Figure 4.2). This suggests that construction projects typically operate through multidisciplinary collaboration, although there are of course exceptions to this.

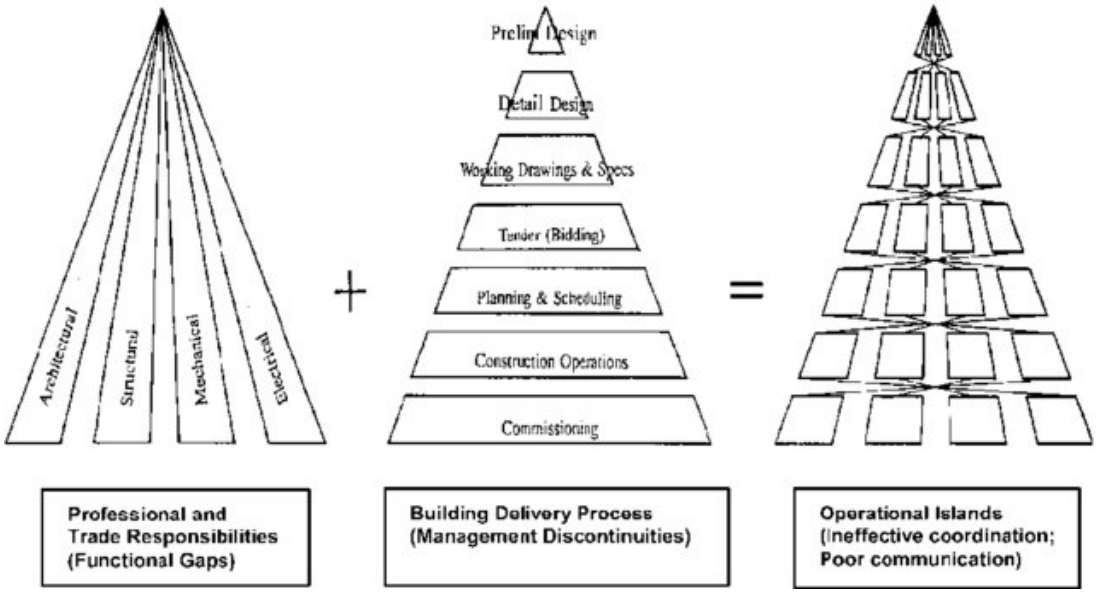


Figure 4.2: Separation of professional decision making in the building delivery process. Sketch: A.G. Mattar, Public Works Canada; reproduced from (Hartkopf, Loftness & Mill 1986)

It is unsurprising therefore, that there is significant research into facilitating more efficient collaboration in the built environment (Fulford & Standing 2014). The efficiency of shifting toward interdisciplinary models of collaboration is expected to result in greater speed, accuracy, and integration, but this is as yet largely unrealized (Fulford & Standing 2014).

Recent research has focused on the use of Building Information Modelling (BIM) software as a collaborative tool to allow more expedient exchange of information between disciplines and stakeholders. Much of this research to date has focused on

industry BIM adoption rates (see for example Burt & Purver 2014; McGraw Hill Construction 2014; Succar & Kassem 2015), but there is also research that is evaluating the software as a tool for enabling interdisciplinary collaboration through Multidisciplinary Design Optimisation (Kodiyalam & Sobieszczanski-Sobieski 2001). This is seen by Gu and London (2010) and Çetiner (2010) as an opportunity to drive efficiency in the construction industry, but may also have applications as a facilitation tool for broader collaborations in urban living laboratories.

4.4 Two models of co-creation: dialectic and dialogic

This section will introduce the work of Richard Sennett as a way of bringing the various threads of this chapter together. Sennett (2012) discusses a variety of concepts relating to collaboration and cooperation, but, perhaps the most critical of these for understanding the models of co-creation and interdisciplinary and transdisciplinary collaboration discussed in this chapter are his discussions on dialectic and dialogic interactions.

In a dialectic argument, a negotiation takes place between a thesis and anti-thesis, and parties often reach agreement through an exchange where each restates the other's point in new language or to negotiate a shared understanding. Sennett (2012) traces the history of dialectic argument to *Plato's Republic,* but suggests that it was more thoroughly developed by Georg Hegel in the early nineteenth century. Fragments such as "in other words . . ." are important in dialectic argument because they allow a concept to be restated and developed, rather than simply repeated (Sennett 2012). Sennett (2012) argues however, that the focus on achieving a single outcome results in a process that can be characterised by expressions of power, dominance, and coercion.

By contrast, Sennett (2012) describes how dialogic argument accepts contradictory points of view and allows seemingly oppositional theses to coexist and interact without requiring resolution into a single view. The dialogic model of negotiation was first described by Mikhail Bakhtin in 1921 in *Problems of Dostoevsky's Art* (Bakhtin 1981). A logical conclusion about this form of interaction is that because no agreement is reached, no outcome is achieved. However, instead of an agreement the outcome of a dialogic argument is mutual learning and development (Sennett 2012).

Both Bakhtin (1981) and Sennett (2012) use music as a way of explaining the difference between the dialectic and dialogic forms of negotiation. Dialectic communication is broadly aligned with monophony and dialogic with polyphony.[39]

The dialectic model can be related with the performance of a monophonic composition. There can be debate about interpretation, but a consensus is necessarily reached through its performance. That is, although there may be many interpretations, there can only be one interpretation associated with each performance of the work. Sennett (2012) suggests that this leads to the most powerful, dominant or coercive voice being responsible for the outcome.

The dialogic by contrast, allows for multiple interpretations to sit within a single 'performance', allowing contributions to go beyond the most powerful or dominant voice (Sennett 2012). As an illustration of the opportunities presented by the dialogic, Bakhtin (1981) describes the concept of the 'polyphonic novel' where layers of information and story are added to each other. Perhaps the best example of this can be found in Buckminster Fuller's *I Seem To Be a Verb* (Fuller, Agel & Clarke 1970). In this book, a variety of typographic techniques are used to juxtapose and intertwine the various layers of information and storytelling with no correct order through which to read the information, nor a single narrative that emerges. The information that is extracted by the reader is therefore dependent on how they choose to interact with it.

The key distinction being drawn here is between a focus on process (dialogic) and a focus on outcomes (dialectic). The distinction is also made by Binder et al. (2015) through the work of Bruno Latour. They use the concept of 'thinging' to advocate for a shift in the focus of collaborative processes from being about creating things to the process of 'thinging'. This approach allows the process of creation to be interrogated, and for a realignment of the output of a participatory approach to be the process itself.

[39] Monophony relates to a single melodic line performed in unison. This includes Gregorian chant and many folk melodies. Polyphony by contrast, relates to complex layering in music. This includes multiple melodic lines as well as contrasting or complimentary timbres, rhythms, and harmonies.

The emergence of dialectic and dialogic collaboration is not just reliant upon the attitude and intent of those participating. Sennett (2012) highlights that the ability to undertake one or the other is also reliant upon a series of physical cues. To demonstrate this, he contrasts the physical layouts of European public halls of the 18th century with those of Parisian cafés in the 19th century, arguing that the long communal tables of the public halls resulted in dialogic exchanges, while the individual Parisian style tables resulted in dialectic exchanges (Sennett 2012). In the public halls, large groups would assemble and debate issues in the public sphere with the intention not to resolve issues, but instead to exchange opinions and ideas and to learn from one another (Sennett 2012). By contrast, the small café tables in Paris in the 19th century, he argues, led to more insular interactions and conversations that through the selection of like-minded companions were more commonly dialectic in nature (Sennett 2012).

In living laboratories and indeed urban living laboratories, there is often a focus on blending physical space with virtual collaborative spaces (Concilio, Puerari & Rizzo 2013). The design of these spaces can also encourage either dialectic or dialogic interaction (Sennett 2012). Sennett (2012) was involved in the early testing of *Google Wave*, an online collaborative space based on ‘waves’. The promotional materials of Google Wave describe ‘waves’ as:

> A "wave" is equal parts conversation and document, where people can communicate and work together with richly formatted text, photos, videos, maps, and more (Google 2009).

Sennett attributes the platform’s failure to the focus on achieving outcomes in a linear process rather than facilitating an open exploration of ideas. This can also be expressed as the platform creating a dialectic rather than dialogic virtual space (Sennett 2012). This is particularly interesting because the collaborations being facilitated were between professional participants rather than engaging with end-user communities. This means that there was likely to be less power-difference between the actors involved, suggesting the platform would be even less successful if applied to user engagement.

Dialectic and dialogic models of co-creation

Returning to the central theme of this chapter (co-creation), the dialectic and dialogic models of collaboration described by Sennett (2012) can be used to describe two different forms of co-creation: a dialectic model of co-creation and a dialogic model of co-creation. In a dialectic model, the focus on reaching an

agreed solution means the focus of the co-creation process would be principally on a solution as the outcome. This is in contrast to a dialogic model of co-creation where the focus would be more on ensuring good process, and the collaboration itself functioning as the intended outcome.

The dialectic model brings a number of challenges in the way in which users are engaged in the co-creation process. As Sennett (2012) describes, a dialectic process is likely to feature significant expressions of power, coercion and dominance, making it difficult for those with low power to be heard.[40] This makes the concept of dialectic co-creation somewhat antithetical with the European Network of Living Laboratories' ambition for living laboratories to establish equal partnerships between industry, academia, government, and citizens (as introduced in section 3.2). The dialectic co-creation concept does however align to some degree with the user-as-subject model of living laboratory where users can be seen as being treated as a variable in achieving an outcome rather than equal partners in the process.

The dialogic model of co-creation, by contrast, aligns more closely with the European Network of Living Laboratories' ambitions. It is focused on establishing partnerships between participants, and on facilitating good processes rather than achieving specific outcomes. A dialogic co-creation process can be seen as supporting the user-as-partner living laboratory model. Rather than focus on achieving specific tasks, the dialogic process would focus on sharing and exchanging viewpoints, placing emphasis on the many (rather than few) outcomes that can arise from this form of exchange.

The notion of dialogic co-creation also returns to an element of the definition presented by Cottam and Leadbeater (2004, p.22) in the first part of this chapter where co-creation was described as a 'creative and interactive process which challenges the views of all parties and seeks to combine professional and local expertise in new ways'.

The dialectic and dialogic models of co-creation being discussed are not intended to be presented as a binary, and it is not the intention of this thesis to suggest one

[40] The notion of power in relation to user groups in urban living laboratories will be discussed further in section 5.4

should be considered to be ‘more co-creation’ than the other. Dialogic co-creation is the model that will be primarily reflected upon in the case study chapters, but as Ind and Coates (2013) and Sanders and Stappers (2008) suggest, there are a broad range of processes that can be labelled as co-creation.

The two models provide an opportunity to think differently about collaboration between professional disciplines as well as with end-users. As was highlighted in section 4.3, co-creation, particularly in urban living laboratories, often involves a variety of professional disciplines as well as end-users, governments, and academia. The dialectic and dialogic co-creation concepts provide some insight into the role of physical (and intellectual) spaces in guiding collaborative process, and suggest some ways in which these processes can be evaluated and therefore valued.[41] As an example, a dialogic co-creation process might place value on the formation of longer-term interdisciplinary and transdisciplinary collaborations rather than the more tangible outcomes that may be sought from a dialectic co-creation process.

4.5 Chapter Summary

This chapter began by discussing the relationship between living laboratories and co-creation before discussing a number of definitions of co-creation. It then explored the terminology of co-creation, co-design and co-production to unpack how these terms might be most appropriately used and introduced the need for inter-professional collaboration in urban living laboratories. This discussion introduced various models of disciplinary collaboration and explored how these may relate back to the co-creation process.

The chapter finally introduced notions of dialectic and dialogic collaboration, linking these with two models of co-creation that were then tentatively linked with the user-as-subject and user-as-partner models of living laboratories. These two forms of co-creation will be reflected upon in the next chapter and used in the case study discussion later in this thesis to describe the impact of having different understandings of co-creation present in an urban living laboratory.

[41] The definition and attribution of value will be further discussed in section 5.8.

This exploration has highlighted the potential for living laboratories to create collaborative spaces within which dialogic co-creation can take place between all parties in the quadruple helix (Arnkil et al. 2010), but equally, for dialectic co-creation to emerge where some participants are necessarily excluded from decision making processes.

This chapter has begun to unpack the unique challenge of collaboration on projects in the built environment and has presented the need for better understandings of collaboration between professional disciplines as well as with end-users. The next chapter will further develop this argument by focusing on models of user-engagement in the built environment.

Chapter 5 User-engagement in the built environment

The previous chapter situated co-creation as an approach to engage with both end-users and professional actors in urban living laboratories and established a distinction between a dialogic and a dialectic form of co-creation. This chapter further develops these concepts, focusing specifically on user engagement in the built environment.

The first part of this chapter outlines the current process for undertaking developments in the built environment in the South Australian context before discussing stakeholder engagement in urban living laboratories more generally. A distinction is drawn between the compulsory engagement that is triggered by legislative processes associated with development and the voluntary engagement that is a feature of the living laboratory methodology. The notion of democratic design is then unpacked in a discussion of the interface between voluntary participation and the democratic right to participation.

The chapter then turns to an exploration of power, particularly focusing on how power is created and how it is used to exert influence and control. This is then discussed in the context of the work of John Forester on Critical Pragmatism before turning to some of the frameworks that are used to evaluate consultation processes in the built environment.

The final part of this chapter explores the idea of value, questioning the International Association of Public Participation's (IAP2) assumption that impact on decisions is the primary form of value from consultation processes. It explores various arguments from social and economic anthropology as a way of articulating some of the complexity associated with theories of value.

5.1 Compulsory public engagement

Compulsory public engagement in the built environment is managed in Australia by either local governments or, for larger projects, state governments. The minimum levels and standards for engagement are not the focus of this thesis but will be described here as a way of establishing a baseline.

For most developments, the breadth of engagement is determined by local government regulations according to the development typology. These systems however, are based on notification rather than cooperation, giving citizens within a certain radius notification of a development application and the opportunity to voice concerns or object (Urban and Regional Planning Solutions 2014).

For larger projects, approval is often given at the state government level. In South Australia, developments valued at over A$10 Million are not subject to local government approval processes and are instead assessed by the state-wide Development Assessment Commission. As a part of this assessment, during the design development stage, developments that are within the City of Adelaide are required to be reviewed by the Capital City Design Review Panel (CCDRP), a part of the Office of Design and Architecture South Australia. The operational terms of reference for this panel use a model of design review closely related to that developed by the Commission for Architecture and the Built Environment in the United Kingdom (Office of Design and Architecture South Australia 2014b). The South Australian panel is made up of Architects and other built environment design professionals at the invitation of the Government Architect and provides independent recommendations to the DAC about the quality of design in a proposal but doesn't have any decision making powers (Office of Design and Architecture South Australia 2014b). The CCDRP process allows feedback on the design of major projects to occur at a time when changes can be made without significant capital costs; critically, the CCDRP is envisioned as a cooperative

rather than combative process (Office of Design and Architecture South Australia 2014a).

Despite the opportunities this process brings for feedback, the terms of reference for the CCDRP are highly specific in terms of the kinds of advice that can be given. While engagement with other stakeholders (such as community organisations) can be recommended, it is not possible for this to be mandated or facilitated as a part of the CCDRP process (Office of Design and Architecture South Australia 2014b). Because of this, the CCDRP can provide high-level professional advice, but is reliant on the legal structures that are established through planning regulations, or a voluntary commitment by a project team to facilitate community engagement.

5.2 Stakeholder engagement in urban living laboratories

In most (non-urban) living laboratory projects, co-creation processes are centred around voluntary participation by end-users (Baccarne et al. 2013; Georges, Schuurman & Baccarne 2014). These processes often focus on motivating end-users to contribute to the development of products and services that can better suit their needs (Baccarne et al. 2013; Georges, Schuurman & Baccarne 2014). Urban living laboratory projects however, often work within the kinds of legal frameworks for consultation that were described in section 5.1. This means they often interface with consultation processes that are based on a democratic right to participation or representation, as well as voluntary participation through intrinsic or extrinsic motivations.

Schatz and Rogers (2016) are highly critical of current approaches to stakeholder engagement in the Australian built environment. They suggest that the current combination of participatory, technocratic, and neoliberal processes has created a series of untenable positions (Schatz & Rogers 2016). Their argument centres on the reduction of participation to a form of consensus building through relying on polling and other opinion-based processes, combined with the power for planning decisions being shifted from the remit of professionals to elected officials, has resulted in planning decisions being made based on what may be perceived as popular rather than best (Schatz & Rogers 2016).

Schatz and Rogers' (2016) criticism relates primarily to the way in which consultation that is required by law is carried out in Australia. An alternative

starting point is to look to voluntary collaboration, that is, stakeholder engagement that is undertaken by choice, often going above and beyond legal requirements.

In their analysis of opportunities to apply collaborative urban planning principles to the development of low-carbon precincts in Australia, Gollagher et al. (2015) highlight that collaborative approaches have the ability to bring together a wide range of expertise from industry, government, academic institutions, and the community, to deliver solutions that would not be possible without collaboration. This has some similarity to the work of Nigel Cross in the 1970s. In announcing 'the coming of the everyman' to design Cross (1972) can be seen as suggesting the inevitability of designers involving non-designers in their processes. Importantly however, Cross (1972) was not describing the end of the design professions, but instead, highlighting that the role of the designer would increasingly shift away from being charged with unilaterally solving problems toward facilitating engaged and collaborative processes (Cross 1972). Binder et al. (2015, p.154) for example, summarise Cross' argument as wanting designers

> to see that the way in which design comes about is as much about involvement and participation of non-designers as it is about bringing professional solutions to societal problems'.

This begins to establish a role for designers of working-with as well as working-for clients.

Gollagher et al. (2015) highlight the potential that this kind of approach may have for facilitating better processes, and authors such as Tan (2010) describe the positive impact a better understanding of these roles may have on the design profession, but many designers are not yet working in these ways (Frediani 2016). In a critique of the current state of design professions, Frediani (2016) suggests that designers typically focus on the creation of a product to solve an ill-defined problem, and that they fail to question underlying issues or to engage with propositions that expand beyond the neighbourhood scale. This leaves something of a gap between the benefits of an engaged and collaborative processes and the way the design industry is operating.

In discussing this gap, Gollagher et al. (2015) highlight the importance of understanding the type of processes that are possible in these collaborations. They suggest that these collaborative processes are suited to big-picture questions and ideas rather than their implementation, or, setting an agenda rather than delivering

projects (Gollagher et al. 2015). The notion of focusing on process rather than outcomes returns to the concept of dialogic co-creation that was described in section 4.4, and is also picked up to some degree in Binder et al. (2015).

Binder et al. (2015) describe opportunities for democratic design experiments that can explore the process of engagement as much as the topic of the engagement. In their discussion on democratic design experiments, they decouple the democratic right to participation from decision making processes, focusing instead on communicative approaches that can be used to explore disagreements and to uncover potential alternatives prior to decision making processes (Binder et al. 2015). This places the focus on process rather than outcomes in a similar way to the model of dialogic co-creation described in section 4.4.

Rather than talking about popular opinion or giving everyone in the community a voice, Binder et al. (2015, p.163) suggest that 'at the heart of democracy lies the option to disagree and explore alternatives'. This is supported by Munthe-Kaas and Hoffmann (2016) who suggest the discipline of planning and the creation of cities should in general become about co-investigating and negotiating rather than unilaterally (or in professional collaboration) devising a vision then working to make it happen.

Between the various positions presented here, the urban living laboratory can be seen as an opportunity for professional designers to experiment with engagement structures, facilitating experimental collaborations that involve end-users in explorative processes. Critically, in this thesis, these processes are assumed to occur outside of the legally mandated frameworks for participation, exploring the notion of consultation as an asset rather than a liability.[42]

5.3 Democratic design in the built environment

There is a body of literature that explores citizen engagement in the design of public spaces through the notion of democracy. This literature includes Munthe-Kaas and Hoffmann (2016), Petrescu, Petcou and Baibarac (2016),

[42] This is not to suggest that legally required consultation should not take place, but that the processes in urban living laboratories can function somewhat separately to legally required consultation. Co-creation in urban living laboratories presents an opportunity to focus on exploration rather than objection and the investigation of new ideas rather than the management of risk.

Krzywoszynska et al. (2016), Manzini and Rizzo (2011), London and Cadman (2009) and Binder et al. (2015). Within this literature, two key themes emerge:

1. That democratic design is about democratising the process rather than the outcomes of a design, and
2. that democratic design experiments (or urban living laboratories) are sites for the exploration of new forms of democracy (collaboration), that sit outside of existing political structures.

These two ideas will be discussed in the following subsections. A third subsection that focuses on the notion of users in urban living laboratories has also been added to also question ‘who?’ as well as ‘how?’ and ‘where?’.

5.3.1 Democratising the design process

Involving the public in decisions associated with the built environment is broadly supported in the literature, but there is some disagreement about how this should take place (Baccarne et al. 2013; Salter & White 2013). Approaches to democratic participation are often split into those that privilege community participation in decision making through communicative planning practices, and those that favour professional expertise through technocratic processes (London & Cadman 2009).

At a macro scale the shift toward communicative planning represents a shift from a rules-based or top-down approach to planning to an engaged and conversational style of planning (Habermas 1984). This approach is challenged by Schatz and Rogers (2016) who argue that direct (rather than representative) public involvement in decision making may in fact be undermining the premise of democracy. They state that

> The rhetorical introduction of 'the market' and 'citizens' as planning agenda setters and decision-makers seems duplicitous and has proved difficult to manage in practice. The duplicitousness draws attention to the way the state might violate the democratic principles that enable the technocratic power of planning professionals if they devolve some of their decision making and agenda setting power to 'the market' or 'local citizens' or indeed both (Schatz & Rogers 2016, p.7).

These challenges would appear to suggest that while ambitions for participatory processes remain similar to those expressed by Cross (1972), there are still some unresolved tensions between the conceptual reasoning of participatory design processes and their actual application.

Schatz and Rogers (2016) focus on how public involvement in decision making processes contravenes democratic principles, suggesting that scaling the outcomes of self-selective public participation in a political system that is built on representative democracy can lead to misrepresentation. Because the views of those who participate may not be representative of the populace, it can be difficult to justify decisions based on public participation (Schatz & Rogers 2016). This is also explored by the Local Government Association of South Australia (2016) in their discussion on the right of citizens to participate in decision making in the built environment. Their assessment suggests that the democratic right to decision making processes extends only to citizens voting for elected members every four years (Local Government Association of South Australia 2016).

5.3.2 Establishing a third space for experimental engagement

Consultation processes can be seen as presenting an opportunity to engage citizens in a debate about cities and in discussions about big-picture social structures and challenges (Frediani 2016). However, the focus of current models on notification and objection do not necessarily realise this opportunity (London & Cadman 2009). The establishment of a new political space outside of the status-quo through democratic design experiments or urban living laboratories provides an opportunity to explore experimental forms of collaboration and engagement. Binder et al. (2015) argue that democratic design experiments provide a space to explore processes rather than outcomes because they can sit outside of existing macro-scale democratic processes. This, they argue, removes many of the tensions and the weight of the historical status quo from the design process, allowing a greater degree of freedom in their outcomes (Binder et al. 2015).

These processes can therefore be seen as a way of exploring not only the development of new products, services, or urban environments, but also the broader socio-technical system within which the process is taking place (Manzini & Rizzo 2011). This begins to link the dialogic co-creation process and the urban living laboratory with Multi-Level Perspective (Geels 2002), presenting an opportunity to engage in both niche and regime or landscape levels.

5.3.3 Defining ‘users’

A key issue that emerges in urban living laboratories is the way in which ‘users’ are defined. This section will not deal with the techniques that can be used in

defining approaches to representative sampling that have emerged in relation to democratic participation. Instead, it will explore the concept of users in terms of voluntary participation in living laboratory projects.

In the design of products, services, or systems user engagement is often centred on Von Hippel's concept of lead-users (Von Hippel 1986). As discussed in section 3.4, lead-users are considered an important part of living laboratory processes because they contribute knowledge about pre-existing ideas or solutions.

Von Hippel (1986) highlights however, that lead users are most likely to emerge and be most useful in fast moving disciplines. Architecture and most disciplines relating to the built environment are not fast moving in comparison with information technology, healthcare and other disciplines that are often the focus of living laboratories (Sauer 2013). This means Architecture primarily focuses on meeting existing rather than future needs (Von Hippel 1986). Another important distinction between a product or service focused living laboratory and an urban living laboratory with regard to the emergence of lead-users is that the creation of a building is typically a singular event. This means that solutions based on positive deviance (described in section 2.5.1), are unlikely to emerge during the design and construction process (Pascale, Sternin & Sternin 2010; Spreitzer & Sonenshein 2004).[43]

In section 3.5 it was observed that in Australia, urban living laboratories are being used as a way of facilitating urban renewal projects on ex-industrial sites. This means they are primarily focused on the development of new communities rather than working within those that already exist.

In projects that work with the existing fabric of the built environment, user groups and communities may be easy to identify; when transforming an existing public space for example, the users of the space can be defined relatively easily. In projects that are developing new communities however, users are often a hypothetical construct at the time of design. This creates something of a paradox where the urban living laboratory is set-up to enable co-creation with users who do

[43] There are a number of exceptions to this assertion that may be interesting sites for urban living laboratory research. These include the development of repetitive housing models, and off-site manufactured modular construction projects. There may also be a further opportunity to investigate the ways in which users adapt buildings as a part of their habitation.

not exist. In these cases, users are often defined through demographic markers and behavioural assumptions. This means the concept of users is limited to serving as a reference point because the data cannot actively (or dialogically) engage in a co-creation process.

There is some interesting work on engaging with proxy end-users stemming from the community design approach of Henry Sanoff. Sanoff (1994) argues that where young children are not able to participate, their perspective should be represented by their parents or teachers. This approach has been tested to some degree by Sanders (2000) who found that very similar insights were gained by engaging with the teachers of pre-school children as from the children themselves. Although the research is not conclusive, it shows that those who know a user-group well may be able to act as a proxy.

In Sanders' (2000) research, she argues that the replacement was only possible because the teachers were intricately familiar with the very specific needs and preferences of the pre-school children. Therefore, a suggestion that adult designers could act as proxies for all adult community members is sharply dismissed because they would need to have a very specific understanding of the needs and preferences of the particular group they are representing (Sanders 2000).

5.4 Power and persuasion

The co-creation literature highlights significant procedural, political, and power-based challenges associated with citizen engagement. There is a great deal of international literature exploring these phenomena including Binder et al. (2015), Munthe-Kaas and Hoffmann (2016), Petrescu, Petcou and Baibarac (2016), and Stevenson, Baborska-Narozny and Chatterton (2016). However, this section will return to the work of London and Cadman (2009), Gollagher et al. (2015) and Schatz and Rogers (2016) because of their specific focus on the Australian context.

The participatory processes associated with compulsory consultation in the development approvals processes is often described as giving democratic legitimacy to processes (Fagan-Watson & Burchell 2016; Vale 2014). However, London and Cadman (2009, p.7) highlight a body of literature (Lyle, 1985; Mayer, 1997; Twedwr-Jones & Thomas, 1998; Steiner 1999) that suggests that 'in many

cases the participatory planning process does little more than grant legitimacy to 'selling' the proposal'.

Schatz and Rogers (2016) suggest this is because of the current neoliberal governance paradigm, where private companies are being called upon to develop high-quality public space as a part of public-private-partnerships. They argue that this has shifted the responsibility for the design and development of 'public good' or public value to private companies who are responsible to shareholders rather than governments who are responsible to the public (Schatz & Rogers 2016). By contrast, London and Cadman (2009) attribute blame to a cultural shift with consultation shifting from being about constructive collaboration to address concerns at a community level in the 1980s to a combative process built on individual concerns and property rights (London & Cadman 2009).

The view that public participation is often hijacked by political and other interests is also supported in a more recent study by Gollagher et al. (2015). They found that

> the practice of collaboration for urban planning in Australia remains skewed towards stakeholder engagement rather than citizen involvement, and towards the inform/consult/involve end of the [International Association of Public Participation] spectrum (Gollagher et al. 2015, p.9).

The engagement with stakeholders rather than citizens describes processes that privilege those with financial involvement in decisions, giving these voices more power. The specific meanings of the levels described in the second part of this statement (inform, consult, involve) will be described in section 5.7 but can be read as signifying low-quality public participation that is focused on building support rather than fostering participation.

This is expressed more pointedly in a critique of the New South Wales state government by Schatz and Rogers (2016). They suggest that tools of direct democracy had been deployed with the goal of generating support for their decisions through 'consensus seeking consultation "events"' (Schatz & Rogers 2016, p.7). They also state that

> In practice, when a government calls for public participation . . . the decision-making power ultimately resides with a suite of bureaucrats operating within one or more institutional sites, meaning that limited power, including the power to resist, resides with citizens in the state-directed participatory process (Schatz & Rogers 2016, p.5).

A similar power-based reasoning is also visible outside of the Australian context. Swyngedouw, Moulaert and Rodriguez (2002) describe the public-participation approaches in thirteen large-scale urban development projects across Europe, and find the processes largely reduced to what they describe as a power-based 'game'. They state that large scale urban development projects

> can be considered as "elite playing fields," on which the stake is to shape an urban future in line with the aspirations of the most powerful segment(s) among the participants (Swyngedouw, Moulaert & Rodriguez 2002, p.568).

Further evidence of the challenges of power being exerted through public-participation can also be found in the provocatively titled *Participation: The new tyranny?* (Cooke & Kothari 2001) and *The nightmare of participation* (Miessen 2010).

The politicisation and power-exerting nature of these kinds of participatory processes is a long way from the ideals of participatory design, co-design, and co-creation, and indeed the living laboratory. This reflects what London and Cadman (2009) describe as the 'persuasion movement' where consultation and participation are used as a way of dealing with conflict and generating political-will rather than delivering better project outcomes.

The notion of the 'persuasion movement' points to a very different understanding of the relationship between engagement with users and success. In the previous chapter a link was established between end-user involvement and the success of a product or service. The use of engagement as a tool for justification or coercion however, points to a very different approach to engagement. In this approach the value of engaging with users can be seen as delivering power and influence rather than ideas or nuance.

Notions of power and dominance were briefly raised in section 4.4 in relation to the role they play in dialectic co-creation (Sennett 2012). It was suggested that when a group, regardless of its membership and its goal, is collaborating in a way that is highly focused on an outcome or a 'solution', elements of power, coercion, dominance and control will emerge (Sennett 2012).

5.4.1 Perspectives on power, dominance and coercion from Social and Organisational Psychology

The expression and use of power, dominance and control in social interactions is dealt with more thoroughly in the field of social and organisational psychology. Authors including Cialdini (1993), Northouse (2007), and Yukl (1989) provide a variety of frameworks for understanding the ways in which this power is expressed.

In his discussion on leadership, Northouse (2007, p.3) describes the power held by leaders, suggesting leadership is 'a process whereby an individual influences a group of individuals to achieve a common goal'. This understanding establishes leadership as a process and suggests that the working relationship in a group is focused on achieving a defined outcome. He goes on to argue that there are a number of different ways leadership is manifest in processes, discussing concepts of assigned versus emergent leadership, power, coercion, and the difference between leadership and management (Northouse 2007). However, Northouse and others (including Yukl 1989) describe power through the ability to influence others.

Northouse (2007) and Yukl (1989) both split power into two components: One that is attained externally and one internally. Positional power is described by both authors as an individual having power over others through the assignation of a formal position (Northouse 2007; Yukl 1989). 'Personal power' (Northouse 2007) and 'expertise' (Yukl 1989) by contrast, are developed individually.

Personal power is argued by Northouse (2007) to be manifest in an individual choosing to follow another through admiration, or through a desire to attain something of value. This is closely related to the concept of charismatic leadership and subtly inverts the focus of the power relationship with the lower-power individual actively choosing to follow the higher power individual (Northouse 2007). Yukl's(1989) notion of expertise may appear to be more technically focused but includes interpersonal skills as well as technical skills.

Both Northouse (2007) and Yukl (1989) highlight that the components of power have a multiplying rather than an additive effect on each other. This means a high position multiplies the impact of expertise or personal power. This also means

however, that being in a position of low-power amplifies powerlessness regardless of expertise or personal power (Northouse 2007; Yukl 1989).

Yukl (1989) and Northouse (2007) are useful in framing notions of powerfulness and powerlessness but for unpacking specific interactions, the work of Cialdini (1993) is more useful.

Cialdini (1993) defines six primary reasons why people comply with requests. These are:

- Reciprocity
- Social validation
- Commitment and consistency
- Friendship and liking
- Scarcity
- Authority

This list is in addition to anticipated economic gain and focuses on decisions that are not made through binary logic (Cialdini 1993).

Reciprocity

Reciprocity refers to the concept of 'favors' and can describe either transactional exchanges or an ongoing relationship (Cialdini 1993). Reciprocity is a well-established relational device but there are many nuanced variations of the ways in which these exchanges take place. The immediate transactional nature of exchange is discussed by Cialdini (1993) with the suggestion that compliance to act can be triggered through the offering of a gift that will generate an expectation of reciprocity. These transactions however can also take place over much longer time-scales. Mauss (2002) provides insight into exchanges at a cultural scale, by describing the process of gift giving in Polynesian, Maori, and Aboriginal Australian cultures. In particular, he highlights the way asymmetric value exchanges structure long-lasting and intricate relationships through various customs and rules, contrasting these exchanges with the transactional relationships of capitalism (Mauss 2002). Interestingly, complex webs of exchange extend beyond person-to-person or even family-to-family exchange and include gifts and exchanges that form entire social or organisational structures (Graeber 2001; Mauss 2002).

Social validation

Social validation is the foundation of the concept of *homo-sociologicus* that was introduced in Chapter 2, relying on an individual's desire to have their behaviour remain consistent with that of others (Cialdini 1993). As previously discussed, this is closely related to the meanings dimension of Social Practice Theory (Shove, Pantzar & Watson 2012).

Latané and Darley (1970) describe how the desire to act in a way that is consistent with others can perpetuate the status quo, through what they define as pluralistic ignorance. In this phenomenon, also known as the bystander effect, each person decides that because nobody else appears to be concerned, there must not be anything wrong (Latane & Darley 1970).

Cialdini (1993) however, highlights that social validation can be equally powerful in triggering action. He suggests that much like Gladwell's (2006) tipping point, when there is a perception that others are taking action, social validation ensures that this will continue to grow and become a new social norm.

Commitment and consistency

Where social validation focuses on maintaining consistency with peers, commitment and consistency refers to a desire to maintain a consistent set of attitudes and behaviours internally (Cialdini 1993). The principle of commitment and consistency can be used to motivate change by highlighting where there are contradictions in an individual's attitudes or behaviours (Cialdini 1993). For example, highlighting that a person has taken action to protect the environment in one area of their life can be a useful motivator for the next change that is to be made. Similarly however, the drive for consistency may lead to the abandonment of a pro-environmental behaviour (Cialdini 1993).

An interesting element of the commitment and consistency principle that is highlighted by Cialdini (1993) is the role of intrinsic and extrinsic reward structures. Cialdini (1993) found across a number of experiments, that behaviour changes triggered by extrinsic reward structures were easier to abandon than those that were based on intrinsic motivations.

Friendship and liking

Friendship and liking can be seen as being linked with trust and social validation. These principles emerged in Chapter 4 in relation to transdisciplinary collaboration. Friendship and liking as a motivational factor focuses on the tendency to comply with requests from those they have an existing interpersonal relationship with, or those that they desire to have an interpersonal relationship with (Cialdini 1993). This notion of a desire for an interpersonal relationship is also a key motivator in the charismatic leadership style where an aspiration to build trust is used as a way of motivating people to work harder (Yukl 1989).

Scarcity

Scarcity is a concept that is typically used in marketing and relies on the perception that if action is not taken, an individual will 'miss out' (Cialdini 1993). This sits uncomfortably with the way scarcity is referred to in the sustainability literature because of the desire to attain rather than conserve what is rare. In an individualistic society such as Australia, [44] instilling a fear of missing out, rather than a fear of running out, can be a powerful motivator (Cialdini 1993).

Authority

The final element described by Cialdini (1993) is authority which is closely related to the concept of positional power (Northouse 2007; Yukl 1989). Authority refers to the predisposition to obey the instructions of someone that is perceived as an authoritative figure in any given situation. Compliance is triggered through either the threat of punitive measures, or more commonly, through the innate belief that a person in a position of authority has a higher level of understanding and knowledge (Cialdini 1993).

Cialdini (1993) highlights a number of cases where seemingly-obvious rational judgement and logic are usurped by the perception that an order has been given by a person of authority. Perhaps the most famous example of this is Stanley Milgram's 'learner experiment' where a subject was instructed by an authoritative figure to give increasingly painful electric shocks to another 'participant' (a paid actor) (Milgram 1963). Compliance in this experiment was near 100% despite the second 'participant' appearing to be close to death (Milgram 1963). The concept

[44] as defined by Hofstede Insights (2018)

of the unquestioned following of an authoritative figure is a demonstration of how positional power can exert influence not only through the threat of punitive measures for non-compliance, but also through the assumption that the person in authority holds a higher level of skills and expertise (Cialdini 1993).

5.4.2 Applications to co-creation in the built environment

Returning to the discussion on the built environment, one of the primary areas in which power and persuasion is manifest in Australia is in the development approvals processes. London and Cadman (2009) highlight how power is often used to contravene the assessments carried out by urban planners in the development approvals process. The approaches they describe can also be viewed through the lens of Cialdini's (1993) work. For example 'calling in a favour' can be seen as reciprocity, the use of a person of high-standing in the community to advocate for a proposal describes social validation, and the high-quality appearance of submission materials conveys a sense of authority.

The techniques described by London and Cadman (2009) primarily relate to professional actors using techniques to amass power. This may not appear to be relevant to the discussion on co-creation and community engagement, but where these techniques are used to manipulate a process, they are contradicting the ambitions of co-creation. For example, where these techniques are used to entice signatures of community members or attract favorable media coverage through the appearance of consensus (social validation), the 'community' are being used to exert power on a decision making body (Cialdini 1993; London & Cadman 2009).

There are similarities here with Kim and Gandhi's (2010) observations on the cooptation of labour in nondemocratic regimes. Their analysis focuses on the way labour forces are coopted into 'supporting' dictatorships and authoritarian regimes, but also describes the way in which power can be used to amass more power, and how communities can be used as a political tool through 'hijacked' or 'fake' participatory processes (Kim & Gandhi 2010).

Removing or at least mitigating the influence of power in these processes may have egalitarian appeal, but Forester (2013) cautions that it is naïve to assume that it is possible to remove power from these city-making processes. He argues instead that rather than trying to remove these power dynamics, a good process works with these dynamics to deliver the best possible process. In setting out a

framework for critical pragmatism (discussed further in section 5.5) Forester (2013, p.14) suggests that

> We need to explore such issues as practical matters, in part because so many skeptics seem to think that the success of participatory or collaborative planning or mediated negotiations somehow depends on a fantasy-like *absence* of power differences or absence of anger and presence of trust . . . working with anger and suspicion, distrust and power differences may simply be part and parcel of working in historically contentious, plural, public settings.

The argument by Forester (2013) for establishing a space in which various emotions, and disagreements can be acknowledged and incorporated into a collaborative process would appear to be in line with the vision of urban living laboratories as spaces to co-create new democratic approaches (Binder et al. 2015; McCormick & Hartmann 2017). Forester's (2013) approach suggests that an important part of the facilitation of co-creation processes in the built environment is understanding the ways in which power is expressed and used, rather than focusing on (the impossible task of) its removal.

5.5 Critical Pragmatism

The concept of critical pragmatism emerges from the work of John Forester (Forester 2013; Forester et al. 2011; Laws & Forester 2007). In making a case for critical pragmatism Forester suggests that the status quo within urban planning is a rationalist approach. Rationalism in its simplest form uses reason and logic to navigate risk as a way of making decisions, but Forester highlights that the rationalist approach often creates a misalignment between intent and outcomes, and defaults to the status-quo. This, Forester argues, has led to consultation processes that minimise risk through a focus on decisions, rather than on the achievement of good process (Forester 2013).

Box 2 below presents a summary of an example given by Forester et al. (2011) to illustrate the problem with current rationalist approaches, and to explain the opportunities presented by taking an alternative, critically pragmatic approach to the planning and execution of a public engagement event.

Box 2: A short summary of a practical example given by Forester et al. (2011) to describe the concept of critical pragmatism and a shift away from rationalism

Larry Sherman, a Canadian architect and planner was invited by a Mayor to advise on the process surrounding a difficult and politically contentious public meeting that was to take place in a Canadian city. The Mayor had proposed a significant and obvious police presence to counter what was expected to be the presentation of anger, fear, and other strong emotions related to the feelings of powerlessness associated with a decide-announce-defend model of public decision making.

By taking a critical pragmatist's approach and concentrating on joint fact-finding, as well as the sharing of different forms of knowledge, Sherman facilitated a cooperative and conversational approach through which a mutual understanding of the issues was reached. As a result of this process the municipality decided to change their position (Forester et al. 2011).

In reflecting on urban planning processes, Forester (2013, p.14) states that

> if we're interested in a workable pragmatism that's not just going to help the loudest, angriest, or most strategic to dominate or destroy public planning processes or public meetings, we will need to think both pragmatically and critically at the same time.

It is from this notion of being pragmatic and critical at the same time, that he describes critical pragmatism. Forester (2013, p.8) initially describes critical pragmatism as involving 'a concern with *consequences* (and what is consequential, what has value and significance) rather than a concern with *intentions* (or hopes or promises)'. He then goes on to define critical pragmatism in more detail, suggesting it:

- attends to both processes and outcomes
- builds on a pragmatic approach by suggesting not only that presented 'knowledge' may be incorrect, but also that we should anticipate its falsehood and plan accordingly
- feeds an understanding of the difference between dialogue, debate, and negotiation, and between facilitating, moderating and mediating
- mediates conflict through similarity rather than difference, and
- focusses on imagination rather than skepticism (Forester 2013).

The subsections that follow will focus on these secondary descriptions of the process. The shift from intention to consequence will emerge in this discussion but will be discussed more specifically in section 5.7.

5.5.1 Focusing on process and outcomes

The suggestion of focusing on both process and outcomes is interesting in the context of the discussion in section 4.4 about dialectic and dialogic models of co-creation. In this section, dialectic co-creation was described as being highly outcome focused and built on the process of dialectic argument; dialogic co-creation by contrast was suggested to be more concerned with the interactions that took place during the collaborative process. The notion of a critically pragmatic approach focusing on both processes and outcomes might therefore be interpreted as combining both dialectic and dialogic models of co-creation. However, the later points of critical pragmatism that will be discussed in sections 5.5.2, 5.5.3, 5.5.4, and 5.5.5 below, suggest that the dialectic notion of a single negotiated outcome may not actually fit within the framework of critical pragmatism.

As an alternative approach, the 'outcomes' element of critical pragmatism could be conceived as a part of the dialogic co-creation process, with multiple outcomes (in multiple forms) emerging throughout the collaborative process. This is visualized in Figure 5.1 below.

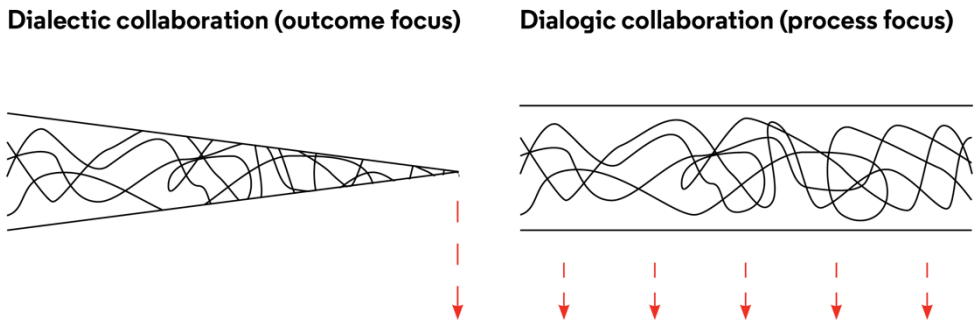


Figure 5.1: The presence and timing of outcomes in dialectic and dialogic co-creation processes. Red arrows denote potential descriptions of outcomes.

Another interpretation of the focus on both process and outcomes may be to align critical pragmatism with the concept of back-casting (Robinson 1982, 2003). However, where back-casting focusses on establishing the steps required to achieve a future goal, critical pragmatism allows a process to be more reflexive and open to changes in direction. This places critical pragmatism in line with Grounded Theory (Strauss & Corbin 1990) and with the iterative design-thinking process (Brown 2008; Buchanan 1992; Plattner, Meinel & Leifer 2012).

5.5.2 Questioning knowledge and planning for falsehood

The suggestion that there is a need to question 'knowledge' or anticipate falsehood establishes an interesting tension between various forms of knowledge. Forester (2013) highlights the importance of considering multiple forms of knowledge, including local knowledge, scientific knowledge, and cultural knowledge. The notion of different forms of knowledge is also raised by MacKinnon and Derickson (2013) in their discussion of 'resourcefulness' that was introduced in section 2.4. From a resourcefulness perspective, different skill sets and technical knowledge can be combined with indigenous or folk knowledge to create new opportunities for knowledge, ideas, and outcomes (MacKinnon & Derickson 2013). Forester's interpretation however, highlights that although something may be considered to be 'true' for one person or group, it may also be shown to be 'false' through a different system of knowledge (Forester 2013).

The tension between knowledge systems is complicated by the dual role that is often played by architects or designers in these processes. Frediani (2016) for example, highlights a tension between the role of the designer as a facilitator or mediator and their role in the development and realisation of concrete design ideas. She suggests in particular that the boundaries between community-held and professionally-held expertise can be difficult to negotiate (Frediani 2016).

Because of the focus on process rather than outcomes there is an opportunity for a process to deliver unexpected or unplanned outcomes. This is in line with the work of Donald Schön who highlights that outcomes cannot always be predicted and that actions can always have unintended consequences (Schön 1983, 1987). The acceptance of different forms of knowledge in a process, and that these forms of knowledge can translate into different understandings of right and wrong suggests there is a need for all actors involved to be willing to critically evaluate their views

and opinions (Forester 2013). For a successful and critically pragmatic approach, all participants from all knowledge systems would need to be ready to identify when their position (a priori or not) on an issue may need to change (Forester 2013).

An interesting approach to distinguishing between professionally-held and cultural or community-held knowledge can be seen in the work of Christopher Alexander (1979). Recognising the importance of engaging with the users of a project whether it is public space, a specific building, or a combination of the two, Alexander (1979) argues for engagement through patterns or 'moves'. His argument is that buildings and urban environments can be reduced to a series of patterns that anybody can combine to form spaces and experiences. While architects typically guard their pattern language closely as a way of justifying their worth, the ability to use patterns rather than technical details to design a building opens the process of design to anybody and removes the gatekeeper-type power of those with technical design skills (Alexander 1979, p.232). Rather than replacing architects, this approach is able to bring people together in conversation about a vision without needing to understand the technical details of architecture or construction (Alexander 1979). This approach of a conversation rather than consultation indicates a focus on process rather than outcomes and aligns with the notion of dialogic co-creation.

For Alexander, successful engagement is about overcoming barriers of power and disciplinary knowledge by sharing the language of architecture and urban design with the public, creating a platform through which to engage in dialogue. He states that

> it is often said that no group of people can create a work of art, or anything which is whole, since different people pull in different directions, and make the end product a compromise which has no strength. The use of a shared pattern language solves these problems (Alexander 1979, p.432).

At the end of his book, Alexander (1979) provides an example of designing a large medical clinic in cooperation with the staff through the development of a pattern language. The process described is strongly correlated with elements of co-design and co-creation described in the previous chapter. What is particularly interesting is that Alexander (1979) facilitated a series of dialogic and dialectic process that enabled the group of non-architects to design and make decisions about the site

layout, and experiential journey of the buildings. However, when the project reached the stage of being constructed (the commissioning of technical drawings and decisions about construction details), it transitioned into what Alexander describes as a 'standard' (rational) process, losing most of the patterns and qualities that had been advocated for by its future users (Alexander 1979). In response to this Alexander argues for a return to craft-based manual-processes; however, this will not be discussed here because pragmatically, it is not likely that this approach would be integrated into the kinds of projects arising in urban living laboratories. The transition point does however represent the technical limit of Alexander's use of the pattern language.

Although not yet widespread in architecture, recent software-based developments that enable automated documentation (Manrique et al. 2015; Singh, Sawhney & Borrmann 2015) may provide an opportunity to revisit this 'limit', because these technologies have demonstrated the ability to replace technical expertise with an automated process. Theoretically, this may allow the concept of a pattern language to be used to generate the inputs for an algorithmic approach to the technical design of a building.

Elements of the pattern language approach persist in architectural approaches such as the co-housing work of Charles Durrett (Durrett 2009; McCamant & Durrett 2011), and in software development. However, broader links may also be drawn between the notion of leveling the expertise of professionals and non-professionals and facilitation tools (such as LEGO® Serious Play®) that do not require specialised knowledge or expertise in order to participate (Alexander 1979).

5.5.3 Dialogue, debate and negotiation; facilitating, moderating and mediating

In describing the roles taken by professionals in the built environment, Forester broadly links the concept of dialogue with facilitating, debate with moderating, and negotiation with mediating (Forester 2013). These roles, particularly the role of facilitator, were previously described in illustrating the role of architects and designers in co-creation processes (section 4.4).

If describing these terms through the process-based explanations of Sennett (2012) discussed in the previous chapter, dialogue can be aligned with the dialogic and debate with the model of the dialectic. Negotiation on the other hand has elements

of both dialogic and dialectic exchange. Within a critically pragmatic approach, Forester suggests that architects and designers will take all of these approaches, acting as a facilitator, moderator and mediator as the process demands (Forester 2013).

Forester (2013) argues that this allows a critically pragmatic approach to be both process and outcome-focused, built on the premise of positive-sum exchange and shared benefit, but to also achieve describable outcomes that are mutually beneficial.

5.5.4 Mediating conflict through similarity rather than difference

The mediation of conflict through similarity rather than difference is a feature of dialogic as well as dialectic communication and highlights the establishment of shared benefits as the starting point for a process based on critical pragmatism (Forester 2013). Where a designer is acting as a mediator, they are not trying to unilaterally come up with solutions or defined outcomes; instead, they facilitate the exploration of shared understanding and the co-creation of outcomes that will be mutually beneficial (Forester 2013). The mediation process is particularly important when participants are coming with different sets of facts derived from different knowledge systems (Laws & Forester 2007).

Mediation focuses on avoiding notions of ‘us’ and ‘them’, and instead establishing a process of ‘joint fact finding’. This approach reframes conflict by suggesting it is the manifestation of a single point of contention among many of agreement. This is similar to Quinn’s competing values framework, suggesting that the point of contention has a complex series of positions and assumptions that can be explored as a part of a collaborative process (Forester et al. 2011; Quinn 1988). The mediation process within critical pragmatism therefore allows the exploration of polarised positions through dialogue and negotiation rather than argument and contestation (Forester 2013). To express this another way, the mediation process allows architects and designers to work *with* rather than *for* the community.

5.5.5 Imagination rather than skepticism

The final proposition, focusing on imagination rather than skepticism, is described by Forester (2013, p.6) as a move

> from a deconstructive skepticism towards a reconstructive imagination, from presumptions of impossibility to explorations of possibility, from a more passive listening to joint, co-generated problem-solving, from

> any premise of narrow, zero-sum adversarial bargaining to creative and expansive, joint-gain orientated negotiations satisfying the interests of diverse publics.

The notion of deconstructive skepticism can be linked with the persuasion movement or a decide–announce–defend model of consultation described by London and Cadman (2009) and Gollagher et al. (2015). The reconstructive imagination on the other hand, describes Forester's ambition for consultation processes that embody the elements described in previous subsections. Critically, Forester's description here highlights that those in positions of authority must shift from passive listening to an acceptance that the community have some valuable contributions to make (Forester 2013).

Forester's work on critical pragmatism would appear to satisfy many of the challenges that were highlighted in the previous chapter. It links processes with outcomes while also preserving the importance of dialogic multiplicity. It also presents a useful framework through which co-creation processes in the built environment can be examined and provides practical guidance for how professionals in this space can work toward creating better processes.

5.6 Toolkits for engagement

One of the key ways in which co-creation processes are applied in living laboratories is through workshops. The facilitation of workshops has gained significant attention in the literature, with a broad range of toolkits and foci emerging. This is unsurprising given Baccarne et al.'s (2013, p.49) suggestion that 'the question is not any longer about why we should involve users, but how they should be involved'.

In 2015, the researcher evaluated 18 toolkits and 114 tools for co-creation (Davis, Crocker & Andrew 2016) The toolkits and tools that were evaluated are presented on the following pages in Table 5.1 (toolkits) and Table 5.2 (tools).

Table 5.1: Toolkits analysed as a part of the creation of the Adelaide Living Laboratory Co-creation Toolkit Draft (Davis, Crocker & Andrew 2016)

Toolkit	Source
MyNeighbourhood Handbook	MyNeighbourhood Living Laboratory (ENoLL)
People's Voice Handbook	Luleå Univeristy of Technology (ENoLL)
The Living Lab Methodology Handbook	Luleå University of Technology (ENoLL)
Supplements to the Living Lab Methodology Handbook	Luleå University of Technology (ENoLL)
Design Kit	IDEO
Human Centred Design Toolkit	IDEO
Bootcamp Bootleg	Institute of Design at Stanford
Innovation Teams and Labs: A practice Guide	NESTA
Business Model Generation Canvas	Business Model Generation
Active Design Handbook	Centre for Active Design
Backcasting	Natural Step
The World Café	Haley Jones
The CAMRA toolkit	Australian Government
Service Design Tools Toolkit	Service Design Tools
IAPSs Public Participation Spectrum	International Association for Public Participation
Healthy Spaces and Places	Heart Foundation of Australia
Effective Engagement Toolkit	Ministry for the Environment, New Zealand
Easy consultation toolkit	Shared Care Scotland

Table 5.2: Tools identified as a part of the creation of the Adelaide Living Laboratory Co-creation Toolkit Draft (Davis, Crocker & Andrew 2016)

Tools			
2 X 2 Matrix	Data-collection session	Immersion	Roleplay
Analogous Inspiration	Define success	Innovation Team Worksheet	Saturate and Group
Aspirations exercise	Define your audience	Integrate feedback and iterate	Scenarios
Backcasting	Design Principles	Interview	Secondary Research
Bodystorming	Determine what to prototype	Issue Cards	Share inspiring stories
Brainstorm	Download your learnings	Journey Map	Sidewalk Context Worksheet
Brainstorm Rules	Dramatization	Journey of an offering	Staff your project
Build a Brick Barrier	Draw It	Keep Getting Feedback	Stakeholder map
Build a team	Expert interview	Keep Iterating	Stoke
Build Partnership	Extremes and Mainstreams	Lego Serious Play	Storyboard
Bundle Ideas	Factors and Forces Exercise	Live Prototyping	Sustainable revenue
Business model canvas	Feedback Capture Grid	Mash-Ups	Ten I's
Capabilities quicksheet	Find themes	Measure and Evaluate	Testing With Users
Card Sort	Focus group	Mobile Probes	The World Café Worksheet
Checklist for concept design	Funding Strategy	Neighbourhood Context	Timelines
Checklist for Discover Needs in Phase	Future Workshop	Peers observing peers	Top Five
Checklist for planning the intervention	Get Feedback	Personas	Transparency Guide
Checklist for prototype design	Get Visual	Photography Exhibition	Urban analysis
Checklist for the Discover Needs Of Phase	Grafiti Sheets	Pilot	Usability Evaluation
Co-creation Session	Group interview	Point-of-view Madlib	User Camera Study
Collage	Guerrilla Observation	Post-it session	User Driven Prototyping
Community Characters Exercise	Guided Tour	Powers of Ten	User experience evaluation
Composite Character Profile	Gut Table Check	Project Plan	Utility and Usefulness Evaluation
Contextual enquiry / shadowing	Heuristic Evaluation	Questionnaire	Video observation
Conversation starters	Highlights Worksheet	Rapid Prototyping	Ways to Grow Framework
Create a concept	How Might We Questions	Recruiting Tools	Why, who and how?
Create a pitch	How Might We?	Resource flow exercise	Wizard of Oz Prototyping
Create frameworks	How? What? Why?	Roadmap	Workshop plan and report
Cultural Probes	Identity Power and Politics		

Undertaking this desktop survey was reflective of the approach that is taken by many in the literature, focusing on the effectiveness of various facilitation tools and techniques (Ballon & Schuurman 2015a; De Carli 2016; Frankova & Woodcock 2013; Lozanovska & Xu 2013; Segelström, Raijmakers & Holmlid 2009; Visser et al. 2005).

A common theme running through various tools presented in Table 5.2 is that they focus on creativity and exploration rather than decision making, or on concepts rather than solutions. This aligns these approaches with the notion of dialogic co-creation and with the notion of focusing on process rather than outcomes that was discussed in section 4.4.

Many of the platforms and tools are designed to give participants the ability to converse on equal footing, working to remove the power differential described in section 5.4 above. This is achieved predominantly through the removal of the requirement for any form of technical expertise, an approach that was also described in the 1970s by Christopher Alexander (1979). Interestingly, this can be directly linked with the discussion about the multiplying effect skills have on positional power, suggesting the removal of technical expertise has a significant impact on the power differential between professional and end-user participants (Yukl 1989).

It may be argued that the skills and expertise of the designer are in some ways being challenged by the use of highly accessible tools. When taken out of context, suggestions like ‘everyone is a designer’ (Manzini & Coad 2015) can be seen to support this assertion. However, the general focus on concepts and ideas rather than specific details means that designers have an increasingly important role to play in translating the conceptual into the tangible.

A number of the tools focus on documenting participants’ lived or future experiences rather than on idea generation. A more recent toolkit published by Brause (2016) also specifically explores the synthesis between different forms of cultural and community held knowledge and design processes. These approaches can be related to the different forms of knowledge described by MacKinnon and Derickson (2013) and Forester (2013) and reflect a range of approaches to this challenge.

As Forester (2013) and Brause (2016) highlight however, although these tools are an important part of the co-creative process, their success is largely governed by the context in which they are applied and the willingness of professional actors to critically engage. In an environment where consultation is seen as a threat to existing decision making hierarchies, or is being applied as a part of a design-announce-defend process, the tools being used may have little impact (Gollagher et al. 2015; Sanders & Stappers 2008). This in some ways returns to the discussion on Multi-Level Perspective (section 2.6) and suggests that the ambition to apply best practice in consultation and collaboration cannot be satisfied through the use of a particular tool or toolkit; instead, it is the sociocultural and sociotechnical systems within which the tool is being applied that become important.

As the example presented by Forester (2013) shows, a good process may require a broad set of attitude changes among professional and community participants, as well as a shift in the definition of what constitutes a project's success. This is not to suggest that the tools and toolkits are not useful, but that the interplay between niche, regime and landscape scales can distort otherwise well-intentioned processes into poor processes. Burck et al. (2014) begin to pick up on this notion with the description of a need to refocus the goal of facilitation to be the creation of a collaborative space rather than the facilitation of collaboration, but stop short of discussing the context within which this collaborative space may sit.

5.7 Defining and measuring participation

An important part of the context within which user engagement and co-creation take place is the evaluation frameworks that are used to define and measure participation. As this section will show, these frameworks have a significant effect on how consultation and co-creation processes are planned and executed.

A cornerstone of the desire to measure participation is summed up by the World Economic Forum (2017, p.25) in the statement that 'it is imperative that citizen engagement is not just symbolic, but rather are equal participants in the development process'. Similar assertions have been made at various levels, including at the level of community consultation in state and local governments in Australia (Department of Sustainability and Environment 2015; Government of South Australia 2016, 2017; Local Government Association of South Australia 2016).

In order to establish if this has been achieved, there is a need to define and measure the degree to which citizens are engaged as 'equal participants' in development processes. Three approaches for defining or measuring participation will be described here:

- the International Association of Public Participation's Spectrum of Public Participation (The IAP2 Spectrum)
- Ackoff's Rules for Particpiatory Processes, and
- Arnstein's Ladder of Citizen Participation.

5.7.1 The IAP2 Spectrum

The IAP2 was established in 1990 with the goal of advancing and extending public participation in decision making (International Association for Public Participation 2018). It carries out this mission by

> organizing and conducting activities to:
> - Serve the learning needs of members through events, publications, and communication technology;
> - Advocate for public participation throughout the world;
> - Promote a results-oriented research agenda and use research to support educational and advocacy goals;
> - Provide technical assistance to improve public participation' (International Association for Public Participation 2018).

The Public Participation Spectrum sits within the technical assistance remit of the association and aims to assist governments and other organisations in planning and reporting on public consultation initiatives. The Spectrum (Figure 5.2) defines five levels of participation: inform, consult, involve, collaborate, and empower. These five levels are described through the description of a public participation goal, and a statement of promise to the public about what will happen. The design-announce-defend model referred to in section 5.4 (Gollagher et al. 2015) sits at the lower end of this spectrum while direct democracy approaches align with the upper end.

IAP2'S PUBLIC PARTICIPATION SPECTRUM

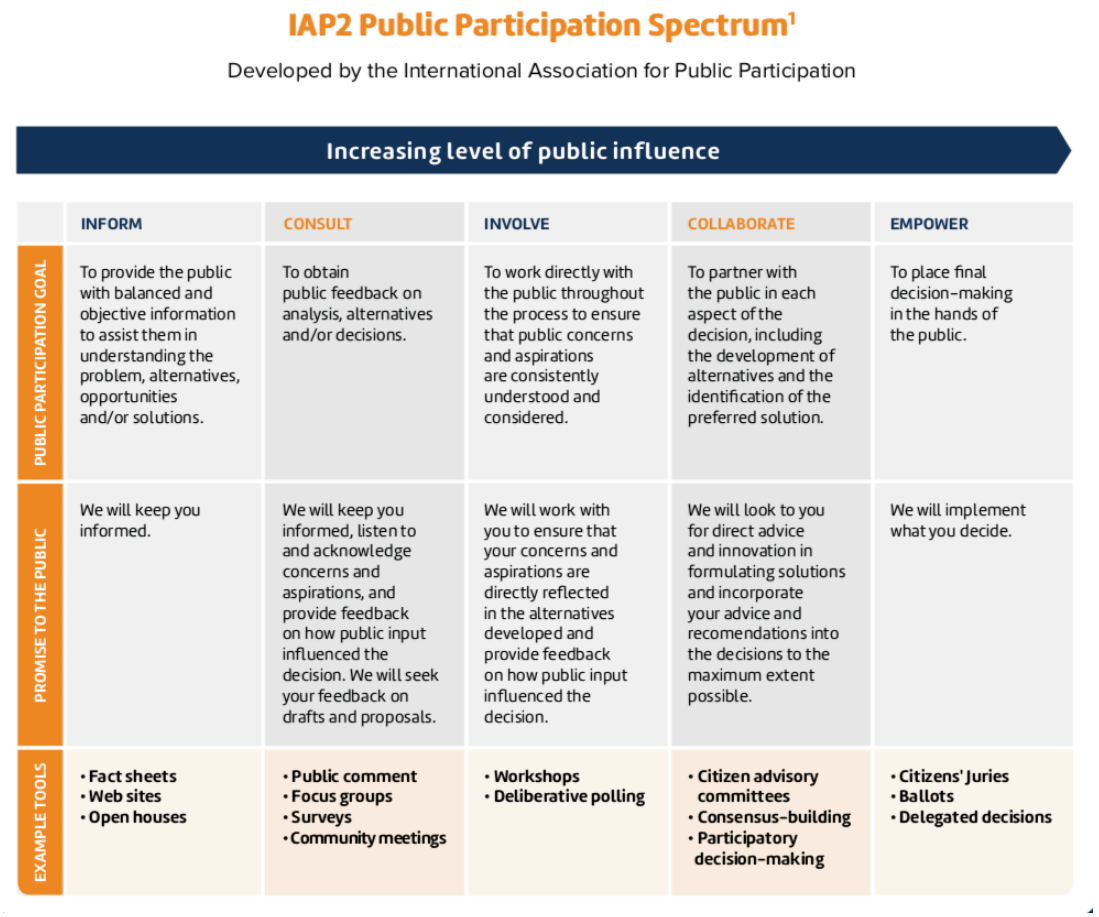
d.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Figure 5.2: The IAP2 Public Participation Spectrum (International Association for Public Participation 2014). Reproduced with permission.

In 2016, the Government of South Australia committed to an ambitious plan to facilitate a shift in consultation processes toward the higher levels of the spectrum by engaging the public in a wide range of government decision making processes through the Better Together program (Government of South Australia 2016). This program sought to give people 'more opportunity to be involved in the decisions that affect their lives' (Weatherill in Government of South Australia 2016, p.3). As a part of this process, a suite of public participation tools were mapped against the levels of the IAP2 Public Participation Spectrum (Figure 5.3).



IAP2 Public Participation Spectrum[1]

Developed by the International Association for Public Participation

Increasing level of public influence

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision, including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recomendations into the decisions to the maximum extent possible.	We will implement what you decide.
EXAMPLE TOOLS	• Fact sheets • Web sites • Open houses	• Public comment • Focus groups • Surveys • Community meetings	• Workshops • Deliberative polling	• Citizen advisory committees • Consensus-building • Participatory decision-making	• Citizens' Juries • Ballots • Delegated decisions

Figure 5.3: Example tools mapped against the IAP2 Public Participation Spectrum in The Better Together Principles of Engagement (Government of South Australia 2016)

The tools listed against each level have been trialled by the State Government to varying degrees; however, more recent publications by both the South Australian government and the Local Government Association of South Australia remove the empower level of this spectrum from their publications; this leaves collaborate as the highest level (Government of South Australia 2017; Local Government Association of South Australia 2016).

The removal of this level could be read as supporting the assertion that consultation processes focus on generating political capital rather than empowering citizens (London & Cadman 2009). However, the reluctance to engage in the required power redistribution it is also consistent with the findings of Sanders and Stappers (2008) and Schatz and Rogers (2016). Further insight into this can be gained through an investigation of what is actually being described by the Spectrum and, how this aligns with the notions of dialogic co-creation and critical pragmatism.

The arrow at the top of the IAP2 spectrum, labeled ‘increasing impact on the decision’ by the IAP2 and ‘increasing level of public influence’ by the South Australian Government, indicates that the levels are defined by the level of impact or influence that citizens can have on a decision. The tools are therefore arranged according to the extent to which they can increase the power that citizens have over decisions. This is in line with what Gollagher et al. (2015) describes as a direct democracy model of participation but also triggers the concerns about representation that were raised in section 5.3 (Local Government Association of South Australia 2016; Schatz & Rogers 2016). In reflecting on the dialectic and dialogic models of co-creation described in section 4.4, these kinds of processes can be related to the dialectic model, meaning power, dominance and coercion are likely to be significant factors in their realisation (Sennett 2012).

By contrast, involvement in a dialogic model of co-creation, or in a critically pragmatic process would be defined through contribution rather than influence. This is not captured in a measure such as the IAP2 Spectrum which is based on power-over decisions. The contribution of information and ideas that may or may not become a part of the decision-making process in a critically pragmatic or dialogic co-creation process would therefore rate relatively poorly on the IAP2 Spectrum.

5.7.2 Ackoff's Rules for Participatory Processes

An alternative framework to the IAP2 Spectrum is Ackoff's (1974) three rules for participatory processes. These three rules describe a series of performance-based criteria through which to judge participatory processes.

Interestingly, Ackoff (1974) does not specifically state these as rules, and they appear to have grown into rules in the years since this publication (for example McGinley & Nakata 2012). The rules are:

1. It should make a difference to the people that participate
2. The implementation of the project should be likely
3. It should be fun to participate (Ackoff 1974, p.53).

This describes a very different approach to that of the IAP2 Public Participation Spectrum, focusing on the impact participation has on those who participate rather than on the project. These rules therefore can be seen as supporting the concepts of dialogic co-creation and critical pragmatism by focusing on the outcomes of the process rather than the impact on decision making.

Making a difference to those who participate

Making a difference to the people that participate requires the project that is being discussed to have direct impact on those being consulted. The successful application of this principle can most obviously be seen in the Participatory Design movement where people were engaged in the design of the products, services, and systems they would use vocationally (discussed in section 4.3).

In the built environment however, the added complexity described in relation to the difference between a living laboratory and an urban living laboratory makes this principle more difficult to employ. As was discussed in section 5.3, decisions about who is and therefore who is not involved in participatory processes in the built environment are complex. Changes in the built environment impact all users of a space, both permanent and temporary, meaning the impact extends well beyond those that are involved in a participatory process (Petrescu, Petcou & Baibarac 2016). This difficulty is highlighted in 'The Tragedy of the Commons' (Hardin 1968) and demonstrates the need for urban living laboratory projects to

consider the impact on end-users beyond those that participate in co-creation or consultation activities.[45]

The implementation of the project should be likely

The second rule focusses on ensuring engagement is occurring on real challenges and in as close to a real-world scenario as possible. This rule developed out of what systems theorists like Ackoff (1974) saw as the challenge of aligning organisational values with personal values. By engaging people in ways that were relevant and related to the 'real-world' of their work, Ackoff (1974) suggests that the reward from effort is likely to come for both the organisation and the individual, resulting in higher levels of commitment and better contributions being made by employees.

In applying this rule to co-creation projects in urban living laboratories, the importance of the pragmatic component of Forester's (2013) critical pragmatism is highlighted. The Government of South Australia (2016) highlight the problem of participation for participation's sake, describing an ambition to be 'genuine' in the consultation they undertake. This suggests a focus on consultation leading to something, or as Forester suggests, connecting a good process with meaningful outcomes (Forester 2013).

Participation should be fun

Although the suggestion that engagement should be fun may appear quite light-hearted, it highlights that there should be value for participants, and begins to suggest that value may not be economic. The question of value will be further explored in section 5.8, but here, it is interesting to note a distinction between economic value and other forms of value.

The value proposition for product, service or system developers to engage with end users (described in section 4.2) is closely linked to economic success; however, as introduced in section 2.5, for users, the value proposition of engaging in co-creation processes is likely to be less economically focused (Füller, Hutter &

[45] This argument begins to uncover a contentious part of urban planning where it is necessary to define who is and who isn't impacted by a project. This is outside of the boundaries of this thesis, but highlights the difficulty associated with defining who should and who should not participate in urban living laboratory projects.

Fries 2012). This makes the assertion that participation should be 'fun' an important signal of the need to consider non-economic forms of value.

5.7.3 Arnstein's Ladder of Citizen Participation

The Ladder of Citizen Participation (Figure 5.4) was published by Sherry Arnstein in 1969 while working at the U.S. Department of Housing, Education, and Welfare (Arnstein 1969). The Ladder describes eight indicative levels of participation ranging from manipulation to citizen control and broadly groups these into three approaches to citizen engagement: nonparticipation, degrees of tokenism and degrees of citizen power (Arnstein 1969).

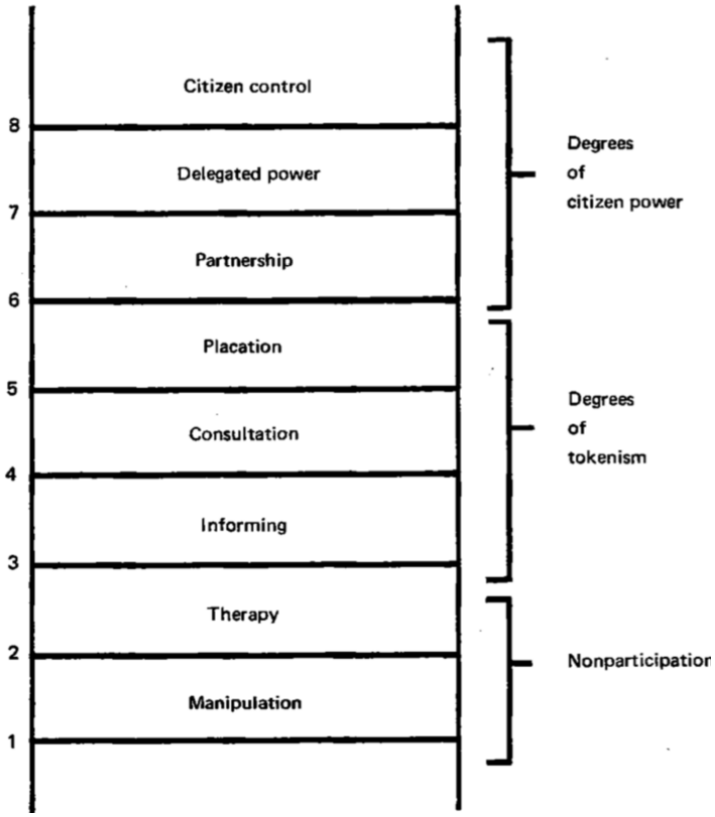


Figure 5.4: Eight Rungs on a Ladder of Citizen Participation (Reproduced from Arnstein 1969)

The nomenclature of this model is similar to the IAP2 spectrum, leading to an assumption by some that they can be linked. McGinley and Nakata (2012) for example link ‘inform’ with ‘informing’, ‘consult’ with ‘consultation’, ‘involve’ with ‘partnership’, ‘collaborate’ with ‘delegated power’, and ‘empower’ with ‘citizen control’. While this may seem logical, there is a significant difference in the language used by the respective frameworks. The IAP2 spectrum is focused on a promise and a plan, while Arnstein’s Ladder describes retrospective evaluation and analysis. This difference may appear to be small, but it is similar to the distinction drawn between rationalism and critical pragmatism by Forester (2013) in section 5.5. It could be suggested that the IAP2 spectrum is therefore more closely aligned with a rationalist approach while Arnstein’s Ladder is more closely aligned with a critically pragmatic approach.

Arnstein’s Ladder provides a framework for further understanding a number of the elements in the discussion about power in consultation processes in section 5.4. The degrees of nonparticipation (manipulation and therapy) can be linked with the concept of the persuasion movement (London & Cadman 2009) and the degrees of tokenism (informing, consultation and placation) can be linked with the decide-announce-defend model of engagement (Gollagher et al. 2015; London & Cadman 2009). The first of the ‘degrees of citizen power’, partnership, appears to reflect many of the collaborative concepts described by the dialogic model of co-creation and by critical pragmatism. The higher two degrees however, delegated power and citizen control, reflect direct democracy approaches (Gollagher et al. 2015) and can be seen to align somewhat with the IAP2 spectrum because of their focus on defining the degree to which citizens gain control over decision-making.

As an analytical framework, Arnstein’s Ladder can be used to describe a number of outcomes that cannot be described through the IAP2 spectrum. Two key examples of this are the ability to describe public participation processes where the goal is to use public participation as a manipulative or political tool, and, when tools are applied in practice in a way that undermines their intent as a part of a co-creation process.

The use of co-creation processes as a manipulative tool may not be something that would be expected in urban living laboratory projects. However, well-meaning processes can cross into this territory relatively easily. The premise of Chapter 2 for example, is that engaging citizens in the urban living laboratory can be a way

to encourage social learning about sustainability. Depending on how this engagement takes place, it could reflect a 'therapy' approach, particularly if 'experts' are not willing to listen to other forms of knowledge.

The second example demonstrates how Arnstein's Ladder can capture the poor execution of tools more accurately than the IAP2 spectrum. Where a poor quality process occurs during a co-creation workshop, an evaluation based on Arnstein's Ladder is able to capture this because of its focus on documenting actual rather than planned outcomes. By contrast, an evaluation based on the IAP2 spectrum would have more difficulty in capturing this because the evaluation criteria focus primarily on if rather than how consultation tools are applied.

5.7.4 The three approaches

The three approaches to defining and measuring participation that have been described in this section demonstrate that there are a range of ways in which consultation can be evaluated. The IAP2 Spectrum provides a starting point for government and other organisations to plan and evaluate consultation activities. However, the focus on increasing citizen power in decision making limits the usefulness of the IAP2 Spectrum in urban living laboratory projects that seek to facilitate a dialogic or critically pragmatic model of co-creation. The lack of provision for 'negative' processes in the IAP2 spectrum is understandable if viewing the IAP2 spectrum as a tool for planning how consultation processes will take place but is problematic if using the Spectrum to evaluate the outcomes of consultation processes.

Ackoff's (2074) rules for participatory processes are arguably a light-touch approach to defining consultation and articulate some of the elements that underpin the IAP2 spectrum and Arnstein's Ladder. These rules provide an interesting starting point for the consideration of non-economic forms of value in stakeholder engagement processes that will be discussed in section 5.8, but don't necessarily translate into a useable planning or evaluation framework in the same way as the IAP2 Spectrum or Arnstein's Ladder.

Arnstein's Ladder is perhaps most closely aligned with the concepts of dialogic co-creation and critical pragmatism. It situates evaluation in outcomes, and doesn't allow abstract measurements, such as participation numbers, to be used to define success. Facilitating processes at the highest levels of Arnstein's Ladder presents

similar problems for urban living laboratories as the IAP2 spectrum, suggesting the partnership level as the most appropriate in these instances.

5.8 Notions of value in co-creation

The concept of value has been touched on a number of times, from the discussion on the value of engaging with lead users in section 2.5 to the value of user-feedback and user-testing in section 4.3, the use of value-exchange to understand the power-dynamics between stakeholders in section 5.4, and the acknowledgement that values and therefore objectives may be competing in section 5.5. This section will briefly describe existing approaches to understanding the value of co-creation processes before establishing a more theoretical position on value that will be used to frame the methodological approach for this research.

There are a range of studies that have investigated the concept of value in co-creation processes, some of which have been discussed previously. This literature ranges from empirical research about the number of ideas generated when engaging with users (such as Mitchell et al. 2015) to research about the effectiveness of specific tools (such as Bornet & Brangier 2015; Coorevits, Lynn & Schuurman 2014). Among the key benefits of a co-creative process that are consistently highlighted in the literature are:

1.) that products and services are designed in a way that meets actual user needs
2.) that participation in a co-creation process helps users to better understand how a product or service works, and
3.) that involvement gives participants an active interest in promoting the success of a product or service.

As this list suggests, much of the focus to date has been on defining the business value of co-creation or more specifically, a business-case for co-creation. This business case is summarised well in the European Union funded report *Design for Innovation: Co-creation design as a new way of value creation* (Dervojeda, Verzijl & Frinderes 2014).

These approaches however, are exploring the value proposition for companies, institutions, or research teams that engage with users. These investigations typically do not explore the value that is delivered to users from engaging in these projects. This may perhaps reflect a market-based assumption that if users are willing to participate they must be getting value from the process.

Where research is carried out into the user-perspective of the living laboratory, it is typically focused on what motivates users to participate. Baccarne et al. (2013) for example, found that the most common motivations for end-users participating in co-creation activities in living laboratories are the desire to collaborate with others (83.3%) and personal interest (78.1%). They also found that participation was motivated by an expectation of financial/material reward in 56.5% of end-users. Interestingly, in this research, the expectation of having an impact on an actual product or service was only reported by 39.1% of participants (Baccarne et al. 2013). This is an important finding in the context of the evaluation frameworks discussed in the previous section (section 5.7) because it suggests a significant majority of end-users are not participating because of a desire to have an impact on decision making processes.

From their data, Baccarne et al. (2013) concluded that participation in living laboratory activities, and particularly co-creation activities is motivated primarily by intrinsic rather than extrinsic motivations. However, they also found that with repeated participation over time as suggested in transdisciplinary collaboration by Stock and Burton (2011), extrinsic motivations become more important. These findings are also supported by Logghe, Oelbrandt and Schuurman (2014) who also found a balance of intrinsic and extrinsic motivations to be important in living laboratory projects.

Baccarne et al.'s (2013) study explored motivations for participation but did not specifically investigate the value that was generated through the participatory process. The limitation of this approach is that it is not clear from their data if the reasons for participation can be linked with the value end-users receive from participation.

Dutilleul, Birrer and Mensink (2010) and Eriksson, Niitamo and Kulkki (2005) take a different approach to understanding value, expressing concerns about whether end-users receive adequate value from co-creation processes. Eriksson, Niitamo and Kulkki (2005) problematize this notion of user value, questioning whether (and how) users receive a fair reward for their contributions. Dutilleul, Birrer and Mensink (2010, p.21) are a little more critical, concluding that 'it is unclear whether users' perceived potential benefits will outweigh the real costs of involvement'.

These criticisms could be read as suggesting the need for economically-based models of profit sharing, but many living laboratories, particularly urban living laboratories, investigate issues that go beyond the design of specific products or services that can be tied to intellectual property agreements. In living laboratories that focus on big-picture issues, value is often defined as the development of shared understandings or improved community knowledge about complex problems (Diederich, Swait & Wirsik 2012; Krzywoszynska et al. 2016; Mitchell et al. 2015).

In the business management literature, a number of models for defining and measuring the value of experiences have emerged. Äyväri (2014) reflects on these value proposition frameworks, describing a shift in focus from the value that is embedded in a product, to the value obtained through its use. She expresses this most succinctly as a shift from an exchange-based understanding of value to a Service-Dominant logic (Äyväri 2014). By extension, this means that the value of an experience is largely created by the user according to their own needs or desires (Äyväri 2014).

The previous section introduced three models for analysing public participation processes: The IAP2 Spectrum, Ackoff's Rules for Participation, and Arnstein's Ladder. Although they focus on the evaluation of participatory processes, they also assert a position on the value of engagement processes for end-users. Through this lens the IAP2 Spectrum can be seen as defining value primarily through the ability of an end-user to impact a decision. Ackoff's rules, particularly that participation should be fun, suggest the importance of the experiential quality of the process in producing value. Finally, Arnstein's ladder can be interpreted as linking participant value with the consultation process, but at the higher levels, also ascribing value to being able to have an impact on decision making.

These frameworks reinforce the notion that value in participatory processes is distinct from economic gain (Baccarne et al. 2013). The disconnection between value and money is dealt with in detail in social and cultural anthropology, and in particular within the economic-anthropology subset of literature. There is not the scope within this thesis to explore this in great detail, but some key highlights include the separation of value from economic measures, the production of value through individual action rather than exchange, and the use of a substantivist or formalist position to describe value systems.

The economic understanding of value through a comparison between cost and benefit comes out of the assumption that value can be defined as a function of what someone is willing to give up in order to obtain something (Simmel 2004). This free-market concept of value is useful in conceptualising rational decision making processes, but as Thaler, Sunstein and Leonard (2008) describe, 'humans' are not rational 'econs'. While Thaler, Sunstein and Leonard (2008) use the apparent irrationality of 'humans' to highlight the importance of default choices in western-economic models, Mauss (2002) uses gift-based economies to explain economically illogical exchanges. A challenge that is shared by both approaches is in defining why people enter into economically un-equal value exchanges, or more specifically, why people give things away with no expectation and sometimes no possibility of reciprocity. This question highlights that there may be elements of some people's contribution to co-creation processes that cannot be explained through processes of reciprocal exchange.

An alternate way of understanding value has its origins in the work of Karl Marx (2014) and is based on defining value through production rather than exchange. Marx's work decouples value from the process of exchange by describing value as being related to the expenditure of human labor (human capital) in production processes. This includes manual labor, but also forms of intellectual capital including creativity (Graeber 2001). In discussing Marx's approach, Graeber (2001) links this idea with an approach to defining value that emerged in the work of Nancy Munn in the 1970s and 80s. He argues that Munn's work extends Marx's concept to include the production of intangible forms of value (such as interpersonal relationships, or feelings of self-worth) in addition to tangible objects. Munn then describes value as being defined internally, through an individual's perception of the importance of an activity, rather than as a product of the exchange (Graeber 2001). Although a somewhat circular argument, this means that individually held hierarchies govern the attribution of value to activities and therefore determine their importance. This allows for the possibility of a non-economic model of positive-sum exchange, but also, a non-economic model of negative-sum exchanges.

The generalisation of this understanding of value, that is to conceive of systems based on individually-ascribed value, relies on an assumption of a synthesised set of values that can be used to assemble individual understandings into a larger

system (Graeber 2001). Unfortunately for this way of thinking about value, although a universal taxonomy of value is something that has been sought by a number of anthropologists, it is considered an impossible ambition (Graeber 2001).

Rather than considering this a stopping point of Munn's work, it may be more useful to question how essential this kind of generalisation is for understanding value. Graeber (2001) describes a debate in anthropology in the 1960s and 70s, between substantivists and formalists. The substantivist position, expressed above, is to explore value through an understanding of society as a whole while the formalist position preferences the exploration of individual motivations and desires. This can be interpreted as substantivists taking as a starting point a total system of exchanges and formalists beginning with the exploration of an individual (Graeber 2001).

Graeber (2001) suggests that this was a pointless debate, not because the positions are irreconcilable, but because they are a false dichotomy. Returning to the discussion within the co-creation and living laboratory literature at the beginning of this section, the approaches that were presented can be seen to largely fit within a substantivist framework, seeking to define universal value of co-creation through business models and conceiving of value as something that is defined through exchange. An alternative approach based on the formalist position will be reflected upon in exploring the Value Network Analysis methodology in Chapter 6 to investigate whether individual perceptions of value creation may be more useful in understanding the value of co-creation or engagement processes.

5.9 Chapter Summary

This chapter began by introducing the compulsory engagement processes that are triggered by the legal frameworks of urban planning in Australia, before discussing the notion of voluntary engagement in participatory processes. This highlighted the challenge of blending voluntary end-user participation with the frameworks and processes triggered by the democratic right to participation in the built environment.

The chapter then presented a number of theories on power relationships, and how power can be manifest in collaborative processes. It then introduced the concept of critical pragmatism, and three frameworks for defining and evaluating public

participation processes. The final part of the chapter described the way value is defined and measured, introducing the idea that value can be understood as being individually created and defined.

Chapter 6 Research Methodology and Methods

This research uses a blended methodological approach, combining a case study approach (Yin 2009) with elements of Grounded Theory (Glaser & Strauss 2017) and Phenomenology (Goulding 2005). This chapter will outline the case study methodology and describe why it has been chosen as a way of investigating the application of co-creation to urban living laboratory processes before describing the interface between the case study approach and both grounded theory and phenomenology. The methods section then turns to a more specific discussion of the methods that are used in the case study research. This section particularly focuses on how the published Value Network Analysis method (Allee & Schwab 2011) is being further developed to align with the discussions in the previous chapters of this thesis. The final section of this chapter will briefly introduce the a-priori hypotheses that this research set out to investigate in line with the case study approach (Yin 2009).

6.1 Case Study Research

The understanding of the living laboratory that is being used in this thesis is based on ENoLL's definition of the living laboratory as a 'user-centred open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings' (ENoLL 2016). As

was described in Chapter 3, this approach shifts the research and theory development from a deductive approach to an inductive approach. In a controlled environment such as a scientific laboratory, an experimentation method that controls variables can use deductive reasoning to establish cause and effect; however, experiments in more complex environments, such as those found in a living laboratory are affected by the 'real-world', that is, by a range of uncontrollable and/or unknown variables. This necessitates an inductive approach to theory development (Braun & Clarke 2006). Although these variables are uncontrollable and/or unknown, inductive reasoning allows researchers to develop theories without fully understanding the variables that are involved (Glaser & Strauss 2017). Critically, inductive approaches form theory based on data, while deductive approaches collect data as a way of testing theories (Braun & Clarke 2006).

This approach of inductive reasoning is more common in the social sciences than the physical sciences, and there are a range of research methodologies that allow for theories to be developed (Babbie 2016). Case study research stems from a variety of historical positions that are summarised well by Hamel, Dufour and Fortin (1993). They credit the development of the case study approach in particular to sociologist Frederic Le Play, anthropologist Bronislaw Malinowski, and academics at the Chicago School (Hamel, Dufour & Fortin 1993).

The varying disciplinary perspectives represented in the development of the case study methodology mean there is a tremendous openness to the ways in which case study research can be carried out (Hamel, Dufour & Fortin 1993). Yin's (2009) approach to the case study methodology is widely used in the social sciences, and in projects relating to the built environment (see for example Aranda-Mena et al. 2009; Oostra 2000). Yin (2009) outlines a methodological and method-based approach to conducting a case study or series of case studies. He describes the case study methodology as allowing for the study of complex, real-world processes and events, and suggests that it provides an opportunity to document and study a process rather than a single event or moment.[46]

[46] Yin's (2009) focus on process rather than moments can be linked with the general focus of this research on the facilitation and measurement of processes of dialogic rather than dialectic co-creation. The ability to capture events over extended periods of time makes the case study approach highly applicable to the investigation of dialogic co-creation. The previous chapters

Yin (2009, p.13) states that case study research is particularly useful when studying a 'contemporary set of events, over which the investigator has little or no control'. As will be seen in the case study chapters, this description is highly applicable to urban living laboratory projects and projects in the built environment more generally. Yin also describes the case study methodology as being able to explore "how?" and "why?" questions within complex processes (Yin 2009). This is important for this research because it is exploring both how and why co-creation might be applied in projects in the built environment.

Case study research is able to generate theoretical propositions but is not able to make assumptions about statistical significance in populations (Yin 2009). This means the focus of case study research is the development of theories rather than the establishment of cause-and-effect. This is usefully summarised by Bennett and Elman (2006) as studying the effects of causes rather than the causes of effect. The case study methodology is therefore useful for uncovering themes, patterns and relationships, but not for making generalisations about frequencies, or statistics (Yin 2009). For this research, this means that the results of the case studies will be presented as a series of theoretical propositions and recommendations based on the experiences of the researcher, but not as statistical facts that can be used to predict future outcomes.

Case study research can incorporate a variety of forms of evidence, including interviews, artefacts, and observations (Yin 2009). This allows the research to include not only what happens when the researcher is present as in an ethnographic study, but also the interactions and exchanges that take place outside of these moments of involvement (Yin 2009). This is critical when studying complex and ongoing processes that extend beyond the boundaries of facilitated sessions where the researcher is present, and allows the emergence of both individual and networked social learning (as discussed in section 2.7) to be documented.

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established the need to focus on process rather than outcomes when planning and evaluating dialogic co-creation processes. This means that a research methodology that focuses on documenting outcomes, such as a quantitative study based on pre-post survey or interview processes would not be able to document and record the rich complexity of a dialogic co-creation process.

Some authors, including Agranoff and Radin (1991) and Lijphart (1975) have suggested a 'comparative case method' should be used to explore themes and patterns across multiple case studies as a way of ensuring their generalisability. However, Yin (2009), does not support such a distinction being made. Although he agrees that external validation of research data is important, he argues that intra-case comparisons can be as valuable as inter-case comparisons (Yin 2009). This argument is particularly relevant for the kinds of cases found in urban living laboratories because the range of events and situations within a single case may provide as many, if not more opportunities to test a hypothesis as multiple smaller cases.

6.2 Grounded Theory and Phenomenology

The previous section (6.1) noted the importance of inductive reasoning in living laboratory research. The notion of developing theory based on data rather than generating data based on theory is an important part of an inductive approach, but this is not necessarily captured within the case study methodology.

Although Yin (2009) suggests that case study design is not necessarily fixed and can be revised if for example, a 'pilot' has shown problems with the design, he suggests that changes should be limited to the case study protocol, meaning changes should not be made to theoretical positions or objectives (Yin 2009). Yin's (2009) reason for suggesting this rigidity is in part related to reliability (discussed further in 6.3), but there are other ways of approaching theory development that do not require such rigidity including Grounded Theory and Phenomenology.

6.2.1 Grounded Theory

Grounded Theory was first described in 1967 by Barney Glasser and Anselm Strauss and set out to provide social researchers with a framework through which they could combine logic and creativity, generating theories at the same time as testing or verifying theories (Glaser & Strauss 2017). Since this initial publication, Grounded Theory has been recognised as being applicable in a broad range of research areas, in particular those involving behavioural studies. Grounded theory is a process where the researcher enters the field of research during the course of their research rather than remaining distant, grounding the work in the behaviours and actions of, and interactions with, those being studied (Goulding 2005). This

means that the researcher is able to adapt and develop their hypotheses in response to their experiences in the case studies rather than being reliant on the a-priori formation of theory.

The situated nature of Grounded Theory supports a range of data collection techniques, that are very similar to those described by Yin (2009) as being a part of case study research. These include in-depth interviews, short observations, and notes, as well as personal reflection on the experience of being a practitioner within the field (Goulding 2005). In Yin's (2009) description of the case study methodology, a-priori theory remains constant, however, Corbin and Strauss (2008, pp.45-46) suggest Grounded Theory establishes validity and consistency through five guidelines:

- Think comparatively
- Obtain multiple viewpoints
- Periodically step back
- Maintain an attitude of scepticism
- Follow the research procedures.

These strategies fit within Yin's (2009) description of research validity that will be explored in the next section and highlight the importance of the triangulation of data and research protocols, particularly in the absence of an a-priori theory.

6.2.2 Phenomenology

Phenomenology describes a philosophical approach that is based on the translation of first-person experiences into a theoretical understanding of the world (Goulding 2005). Phenomenology and Grounded Theory are very similar methodologies but their subtly different foci make the use of a blended methodology important. Grounded Theory is focused on the development of theories about the underlying cultural conditions that are informing the interactions between, and behaviours of, participants. Phenomenology, by contrast, is focused on individual experience and establishes a framework for the consideration of individual experience as 'truth'.

The ability to consider individual notions of 'truth' aligns with the concept of multiple truths captured within Critical Pragmatism (discussed in section 5.5) and with the individual as well as communal construction of value introduced in section 5.8. The phenomenological approach is used to some degree in Cases A and B as a way of interpreting the researcher's experiences and constructing theories. In Case C however, the phenomenological approach becomes more

important. Here, phenomenology allows for the presentation of multiple truths about the value of the co-creation process, treating value as the product of individual experience rather than of communal exchange. This will be further explored in the discussion of the Value Network Analysis method in section 6.6.2.

6.3 Validity of the research data

The validity of the research data will be demonstrated through Yin's (2009) validity testing framework that is published as a part of his description of the case study methodology. Yin (2009) posits that social science research relies upon four types of validity testing that occur at various stages of the research process:

- construct validity
- internal validity
- external validity, and
- reliability.

Construct validity

Construct validity refers to the way in which data is translated into themes; for a construct to be valid, it is important to ensure that the theoretical position that is being described is rooted in the data that has been collected (Yin 2009). In this research, data will be collected from a range of sources (described further in section 6.6), and discussed in the context of the many variables present in the case studies that are not controlled by the researcher. In line with the phenomenological approach, the link between data points and themes or theories will be demonstrated through the use of specific examples of data from interviews as well as from the literature.

Internal validity

Internal validity describes the use of cross-checking within a case or data set to ensure theoretical position is not being based on outlying data points, or on isolated and unique events (Yin 2009). Within the case analysis, actors are grouped by their role-type (broadly separated into professional and end-user roles), to establish patterns of response and behaviour within role-type groups. Where conflicting reports emerge, these will be addressed through logic models, disclosing the outlying data while expressing the more common position (Babbie 2016). Although a large sample is not required because the case studies are not intended to be statistically representative, where assumptions are being made based on a small number of responses (less than three), these are acknowledged

and qualified. The comparatively small number of respondents in the professional-group in each case is accounted for by more cautious assumptions being made.

External validity

As described in section 6.1, external validity is often demonstrated in a case study approach through the use of secondary cases or secondary parts of cases to test hypotheses (Yin 2009). Because the research embraces a Grounded Theory approach to theory generation and data collection, there is not the scope to test the hypotheses in multiple cases. However, another approach to ensuring external validity of case study data is to use secondary data from the literature (Yin 2009). The experiences of each case in this research are therefore reflected upon in the context of the literature to investigate whether they are likely to be case-specific, or whether they contradict or support previous findings. However, for some theoretical propositions there is similar research within the literature that can be referenced, while for others, the unique methods being utilised in this research make comparisons more difficult. This is particularly the case in the context of the Value Network Analysis approach that will be used in Case C.

Reliability

The notion of reliability, particularly in the physical sciences is typically linked with replicability. In a case study approach, rather than attempting to replicate results of one case in another, Yin (2009) suggests that multiple cases or multiple explorations within a single case can be used to minimize errors and bias. As discussed in the above section on external validity, the use of Grounded Theory as a methodology limits the ability to conduct multiple parallel cases. This research will instead use multiple methods of data collection to ensure the reliability of data. Internal comparisons can be made through the documentation of the research through a variety of methods, including workshop reports, journal entries, photographs, artefacts, and transcripts. The reliability of data is further ensured through the development of protocols for the semi-structured interviews and the Value Network Analysis process. These methods will be described further in section 6.6.

6.4 Case study selection

This research was undertaken with support from the Australian Federal Government funded Cooperative Research Centre for Low Carbon Living as a part of the Adelaide Living Laboratory project. This means there was an impetus to use projects that were undertaken within the Adelaide Living Laboratory as case studies. However, the kinds of research that were enabled by the organisational structures of the Adelaide Living Laboratory (described in Chapter 7), led to the final case (Case C) being sourced from outside of the formal boundaries of the Adelaide Living Laboratory. There is however a formalised relationship between the organisation involved in Case C and the host university of this PhD research.

The relationship between the cases that will be discussed as a part of this thesis are illustrated in Figure 6.1 below. As this figure shows, the Parkland Community Garden (Case B) occurred as a part of the Adelaide Living Laboratory (Case A) while U City (Case C) did not. The Adelaide Living Laboratory and Parkland Community Garden are being discussed separately because the former is reflecting on the researchers' experiences of the urban living laboratory as an organisation through a phenomenological lens while the latter focuses on the effects of specific co-creation activities.

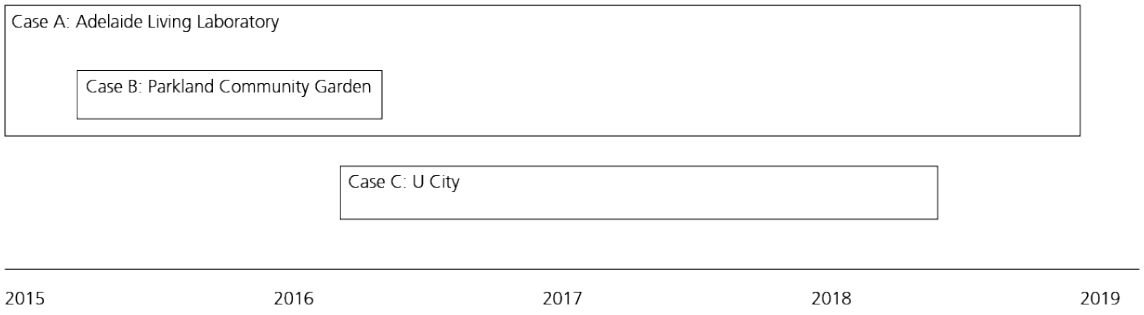


Figure 6.1: Case study timeline and relationships

All cases are based in Adelaide, South Australia but differ in terms of time, budget, and physical scale. Case A discusses the researcher's involvement in both the Adelaide Living Laboratory and the Cooperative Research Centre for Low Carbon Living across four years. Case B is a small community garden project that was completed with a small budget over the course of 12 months in partnership with a number of organisations involved in the Adelaide Living Laboratory. Case C is a large commercial construction project with a more significant budget that is expected to be completed in the second half of 2019.

Case A provides an opportunity to investigate how co-creation fits within the organisational framework of an urban living laboratory. Case B on the other hand, allows for the investigation of how co-creation can be used to foster social innovation and develop community resilience through social learning. Case C is then framed in response to the experiences in Case A and Case B (in line with Grounded Theory) and investigates a gap in understanding that is identified in these earlier cases.

6.5 Ethical considerations

Human research ethics approval was granted for this project by the Human Research Ethics Committee of the University of South Australia. This ethics approval was necessary because the research was being carried out with members of the public, and because the interview process asked participants to reflect on personal feelings and experiences.

The primary partner organisation in Case C works with a number of vulnerable and at-risk populations. It was decided in consultation with this organisation that these user-groups would be excluded from the research.[47]

[47] Although user engagement is a critical part of the co-creation methodology, the challenge of not being able to engage with these vulnerable and at-risk groups was addressed through the work of Sanders (2000) discussed in section 5.3.3. Sanders (2000) suggests that it is possible for those who work closely with a particular group to provide feedback that is highly similar to that which would be attained directly from the user group. This will be reflected upon further in the discussion of Case C.

6.6 Methods

Yin (2009) describes six categories of data collection techniques that can be used in case study research:

- documentation
- archival records
- interviews
- direct observation
- participant observation, and
- physical artefacts.

While there are precedents for using a single data collection technique, a triangulation approach where multiple data sources are used is generally accepted as a way of increasing the validity of the data by removing bias that may be associated with particular methods (Babbie 2016; Hamel, Dufour & Fortin 1993; Yin 2009). This research utilises data collection techniques across four of Yin's (2009) categories as summarised in Table 6.1 below.

Table 6.1: Methods of data collection aligned with Yin's (2009) categories of case study data

Yin (2009)	Data collection method
Documentation	Marketing information
	Workshop agendas
	Workshop reports
Interviews	Semi-structured interviews
	Value Network Analysis
Direct observation	Photographs
Participant observation	Facilitation of co-creation workshop activities
	Reflective journal entries

6.6.1 Documentation

Marketing information

Marketing materials and self-published reports are used as a way of describing how the case study projects are being presented. In particular, these materials are used in order to explore the relationship between the experience of a case and the way it is being presented publicly.

Where documentary evidence such as this is being presented, the framework of Critical Discourse Analysis is used to link this evidence with the social world (Fairclough 2013). Fairclough (2013, pp.10-11) describes three elements that are necessary in Critical Discourse Analysis:

1. It is not just analysis of discourse (or more concretely texts), it is part of some form of systematic transdisciplinary analysis of relations between discourse and other elements of the social process.
2. It is not just general commentary on discourse, it includes some form of systematic analysis of texts.
3. It is not just descriptive, it is also normative. It addresses social wrongs in their discursive aspects and possible ways of righting or mitigating them.

These three elements will be specifically addressed where Critical Discourse Analysis is applied in this research.

Workshop agendas

Workshop agendas are used as a record of the activities that took place, and the tools that were used. These agendas also contain information about the logistical characteristics, timing, and planned attendance at each workshop.

Workshop reports

Workshop reports have two primary functions:

- providing a record of the data that is generated during a co-creation workshop, and
- helping to translate the outcomes of a single workshop into the broader co-creation process.

Workshop reports in Case B and Case C were circulated with participants prior to their publication to ensure there is agreement on the outcomes of each co-creation session. These reports serve as a shared reference point for the co-creation workshops and a tangible record of the processes that took place.

6.6.2 Interviews

Semi-structured interviews

Semi-structured interviews are used as a primary form of data collection in Case C. The majority of these interviews were individual, however, group interviews were conducted on two occasions at the request of participants. The interviews typically lasted between 40 minutes and 1 hour and began with a series of semi-structured questions, followed by a less-formal discussion using the value-network-analysis process that will be described in the next section. The semi-structured interview protocol will be presented as a part of the data in Case C.

Babbie (2016) notes that in field research the semi-structured or qualitative interview is more useful than structured or quantitative interviews because of its ability to explore open-ended research questions. Unlike a survey or questionnaire, a semi-structured interview allows the researcher to use what he described as

> a general plan of inquiry including the topics to be covered, but not a set of questions that must be asked with particular words and in a particular order (Babbie 2016, p.311).

In this research, the semi-structured interview is preferable because it facilitates an open-ended discussion about the events surrounding end-user engagement in co-creation processes, exploring the social and cultural influences on the process as well as the specific actions taken by participants. The flexibility within a semi-structured interview aligns closely with both Grounded Theory and Phenomenology. Rubin and Rubin (2011) for instance, describe how the iterative process means that line of questioning is continuously being redesigned.

> Each time you repeat the basic process of gathering information, analyzing it, winnowing it, and testing it, you come closer to a clear and convincing model of the phenomenon you are studying (Rubin & Rubin 2011, pp.45-46).

The data from these interviews is analysed using both quantitative and qualitative techniques. The first analysis, based on the framework of Social Practice Theory (Shove et al. 2012) relies on a quantitative assessment of the recognition of concepts and ability to define terms. The second analysis, based on the Value Network Analysis process however, will be driven by a qualitative assessment of the data. This will use an inductive thematic analysis process to establish a series of forms of value exchange (Boyatzis 1998).

Value Network Analysis

Value Network Analysis is a form of network analysis that was first described by Verna Allee in 2000 that seeks to describe both tangible and intangible value flows within organisations (Allee 2000). Value Network Analysis can be considered as a branch of Social Network Analysis or Organisational Network Analysis because it can be used to map network structures as well as the flow of knowledge and information between actors (Allee 2008). Unlike Social or Organisational Network Analysis however, Value Network Analysis provides a framework for capturing the exchange of both financial and non-financial assets and is able to map the creation and transaction of non-monetary forms of value (Allee 2008).[48]

The nodes of the network in a value network are built from roles rather than actors, because any one actor can take on multiple roles (Allee & Schwab 2011). Like Social Network Analysis, connections between nodes describe a relationship (Wasserman & Faust 1994). However, the Value Network Analysis process interrogates these connections to describe the direction and type of transaction taking place (Allee & Schwab 2011).

In a Value Network Analysis a solid line indicates the presence of a connection (as with Social Network Analysis), while directional arrows describe the transaction of a tangible deliverable, and a dashed line with directional arrows indicates the transaction of an intangible deliverable. This means that it is possible for many connections to be drawn between nodes, each indicating a different form of transaction taking place (Allee & Schwab 2011).

The specific protocol for the Value Network Analysis conducted in this research is documented as a part of the presentation of Case C in section 10.3. However, in the discussion that follows, the approach to Value Network Analysis that is being taken will be briefly explained.

To date, Value Network Analysis has primarily been applied as a tool in business development and organisational management. In this research, the method is being

[48] An important part of the value exchange process, particularly in social innovation networks, is the creation of intangible value. As discussed in section 5.8, intangible assets are often understood primarily by their ability to produce a tangible form of value. Understanding the value of translating one intangible asset into another intangible asset requires a method of analysis that goes beyond traditional economic structures.

used as a way of understanding the network of actors involved in the co-creation process rather than those within a single organisation. Therefore, in this research the published method of Value Network Analysis (Allee & Schwab 2011) is being augmented with a series of small developments:

- The network is being defined through involvement in a project rather than an organisation
- multiple perspectives are being overlaid to explore individual perceptions of value rather than seeking to establish a single network-based 'truth'
- the notion of 'black boxes' from Actor Network Theory (Latour 2005) is being incorporated, and
- inductive thematic analysis (Boyatzis 1998) is being used to facilitate the exploration of discrepancies in the macro value flows in the co-creation process.

Defining a network through involvement in a project rather than an organisation is linked with the concept of multi-sited ethnography described by Coleman and Von Hellermann (2011). In the multi-sited ethnographic approach actors are connected through their involvement in a network rather than by physical space (Coleman, S & Von Hellermann 2011). This allows the analysis to explore the co-creation process as a whole, rather than the value exchanges taking place within a single (shared) space or event and extends the application of Value Network Analysis beyond traditional organisational boundaries.

The notion of engaging with multiple perspectives rather than a single 'truth' may be seen as being related to a constructivist epistemology, but is added as a way of allowing the experiences of each participant to be explored through a phenomenological lens (Babbie 2016). This is described to some degree in the Value Network Analysis method with the suggestion that it is unlikely a single person will be able to provide information about the entire network (Allee & Schwab 2011). Allee and Schwab (2011) suggest building the Value Network Analysis through a 'neighbourhoods' approach where individual participants in the network map their part of an organisation rather than seeking to find one actor that is able to understand the entire network. The limitation of this approach however, is that it is focusing on describing a universal or singular network 'truth', treating discrepancies as misrepresentations or misunderstandings rather than opportunities for perception-based investigation. This returns to the discussion on the work of Nancy Munn in section 5.8 with the suggestion that value can be seen as being defined individually. By using a phenomenological approach to explore the value that is described by each individual, there is an opportunity for multiple 'truths'

about a value exchange network to emerge, something that cannot be captured within the existing Value Network Analysis method.

The addition of 'black boxes' from Latour's Actor Network Theory (Latour 2005) allows processes that are known but unknown to each observer to be incorporated into the Value Network Analysis process. 'Black boxes' are systems where the input and output are known but the process involved in translating the input into the output is unknown (Latour 2005). For the Value Network Analysis process in this research, the inclusion of these 'black boxes' in the mapping process allows events or processes that are known but unknown to individual participants to be captured and discussed as nodes in their perception of the value network.

The inductive thematic analysis process is used as a way of beginning to reconcile the multiple perspectives of value generated through the other additions to the Value Network Analysis method (Boyatzis 1998). As discussed in section 5.8, this research was unable to locate a taxonomy of value that could be used to conduct a meta-analysis of the value exchanges that are identified in the network. An inductive coding process, as described by (Boyatzis 1998) will therefore be used to establish categories of value that can be compared across the multiple descriptions of the value network. This enables, for example, amalgamated professional and end-user experiences of the network to be compared through an exploration of the frequency of exchange of each value type.

6.6.3 Direct observation

Photographs

Photographs can be used to provide a transparent record of activities as well as insights as a part of case study research (Prosser & Schwartz 1998). Photographs taken during co-creation workshop activities can document the physical space as well as some of the characteristics of the interactions between participants. However, photographs can also misrepresent experience and selectively capture facts (Prosser & Schwartz 1998). In line with Yin's (2009) recommendation on photography, where possible more than one observer is asked to take photographs to increase the reliability of this observational evidence.

In Case C, a photo-journal process (Prosser & Schwartz 1998) is presented as a part of a workshop session. However, this photo-journal was used for the

collection of data to support other workshop activities rather than specifically as research data.

6.6.4 Participant observation

Facilitation of co-creation workshop activities

As discussed in section 5.6, an early stage of this research involved the development of a co-creation toolkit that brought together co-creation methods from a variety of sources. These sources were identified using a desktop survey method and provide a snapshot of the ever-increasing number of toolkits that have been developed to facilitate design thinking and co-creation processes. A summary of the toolkits and tools that were identified was presented in section 5.6.

In the previous discussion it was highlighted that although there are a large number of co-creation toolkits that have been created for use in urban environments, there are few publications evaluating the success of the various tools and techniques in urban living laboratories, particularly in the Australian context. Instead, analysis of urban living laboratories has typically focused on their strategic direction and their administrative and operational structures (see for example Concilio et al. 2013; Concilio, Puerari & Rizzo 2013; Nyström et al. 2014).

Rather than setting out to quantitatively test the efficacy of specific tools across the various co-creation workshops (as can be seen in Milliken, Bartel & Kurtzberg 2003; Stasser & Birchmeier 2003), the efficacy of the tools is discussed in the context of their impact on the workshops. This means they are assessed through their ability to address the questions in each workshop rather than as stand-alone elements.

Where no suitable method was found for facilitating a discussion around a particular challenge, new tools or techniques were created. The tools used in each of the case study workshops that was facilitated by the researcher, as well as the results obtained from their use, are presented in short workshop reports that were distributed to participants shortly after each workshop (discussed in section 6.6.1 above).

Reflective journal

A series of reflective journal entries and notes were made about the researcher's involvement in the cases over the four years of the research. The entries cover the experiences of the researcher in relation to the establishment of the cases, reflections on the workshops where the researcher was involved as a facilitator, workshops attended by the researcher, formal and informal meetings related to the projects, and other conversations between the researcher and various stakeholders.

These reflections contain notes on the researcher's experiences, assumptions, and track the development of emergent theories. The journal reflects the phenomenological approach used in this research with the personal experience of the researcher used as a significant data source (Goulding 2005). In line with Grounded Theory, the reflective journal was also used as a planning tool, using the reflections to guide the direction of further research activities (Glaser & Strauss 2017).

Together with the other data points in this study, this reflective journal provides insights into the underlying social and cultural conditions that may have impacted upon the co-creation process. It also shows the development of theory in response to the experiences of each case study.

6.7 Methodological precedents

A similar research approach can be found in Stollmann (2016), who investigated the integration of live-project and design-build project methodologies with community engagement through a case study approach. The framework for his investigation combines elements of situated research, action research, and collective social learning. In this research, Stollmann was an active participant as well as the investigator, and combined a facilitation role with the evaluative and investigative role. The findings form this research also focus on value, ascribing value to the social learning process associated with the community being engaged in the city making process (Stollmann 2016). However, this conclusion is reached without any formal definition or measurement of this value.

6.8 A-priori hypotheses

The need for an a-priori hypothesis is disputed between Yin's description of the case study approach and Grounded Theory. As discussed above, Yin suggests that

it is important to use the case study to test a pre-existing hypothesis so as to avoid biasing the research data to simulate success (Yin 2009). Grounded Theory on the other hand notes the importance of the researcher remaining open and generating and testing their hypotheses during and through the case study process (Glaser & Strauss 2017). This research uses elements of both approaches, with an a-priori hypothesis informing the research design, but enough flexibility maintained to allow the focus to shift as the case studies progress.

The a-priori hypothesis in this research is that when applied to projects in the built environment, the co-creation process will build community resilience through processes of social learning. This initial hypothesis was the basis for entering the field of research, but evolved into two further hypotheses. The first is that the tools being used to facilitate co-creation processes in the built environment are unsuitable, and the second, that the value of co-creation processes is not well understood by professionals in the built environment.

Chapter 7 Case A: Adelaide Living Laboratory

This chapter presents an analysis of the researcher's experience of being involved in the Adelaide Living Laboratory project as a part of the Cooperative Research Centre for Low Carbon Living (CRCLCL). These experiences are used as a way of exploring some of the challenges associated with applying co-creation as a methodology in urban living laboratories and to projects in the built environment more generally. It focuses in particular on the differentiation between the user-as-subject and user-as-partner models of living laboratory that were introduced in section 3.2, and on unpacking the tensions between empirical and social research methodologies that appear to align with these distinctions.

This is the first of three cases to be presented. This case and Case B establish the framework for understanding the research that was conducted in the major case study (Case C).

7.1 Introduction

The experience of being a part of the Adelaide Living Laboratory and the CRCLCL had a significant impact on this research. In line with the Grounded Theory methodology, these experiences are considered to be an important part of the research and are therefore being reported through the framework of a case study.

This case is described through a combination of data from the researcher's reflective journal and documentation evidence. The reflective journal informally documents the researcher's experiences over four years, from 2015 until 2018, while the documentation evidence is comprised of three key publications about the Adelaide Living Laboratory.

Because of the nature of the data being used to describe this case, this chapter takes a discursive approach to the presentation and interpretation of the researcher's experiences in line with Grounded Theory and Phenomenology. The key findings in this case are presented in section 7.3 and discussed in section 7.4. Section 7.3 presents evidence from the researcher's reflective journal separately to the documentation evidence to allow comparisons between the two data sets. The documentation data is explored through a Critical Discourse Analysis (Fairclough 2013) and aligned with the experiential data. This allows a series of conclusions to be drawn about both how and why the approach to the urban living laboratory taken by the Adelaide Living Laboratory may have changed over the four years of its operation.

The aim of the discussion in this case is to build on the living laboratory literature discussed in Chapter 3 and to begin to explore the main question of this thesis: the optimal conditions for the application of co-creation to projects in the built environment.

7.2 Development of the Adelaide Living Laboratory

The Adelaide Living Laboratory was launched on 1 December 2014 as a partnership between the Cooperative Research Centre for Low Carbon Living, the University of South Australia, Renewal SA, HASSELL (architecture), Aurecon (engineering), and Multiplex Constructions. The researcher has affiliation with both the University of South Australia and the Cooperative Research Centre for Low Carbon Living as the host university and funding body for this research. Renewal SA is a department within the Government of South Australia and is primarily responsible for the development of government-owned land, while HASSELL, Aurecon, and Multiplex Constructions are all international firms with offices in Adelaide, South Australia.

The Adelaide Living Laboratory was established with elements that sit across two of the three categories of urban living laboratory described by Bulkeley et al.

(2018) that were introduced in section 3.4 (civic, strategic, and organic). The project elements that were to be led by Renewal SA, a department within the Government of South Australia, would classify the Laboratory as civic in orientation, while those elements that were to be led by the University of South Australia would suggest a strategic classification (Bulkeley et al. 2018).

The Adelaide Living Laboratory was established specifically as an Urban Living Laboratory with three sites across metropolitan Adelaide: Lochiel Park, Bowden and Tonsley (Figure 7.1). Locating the Adelaide Living Laboratory at these specific sites aligns it with the notions of 'situated solutions' (Barroca et al. 2013) and 'geographical embeddedness' (McCormick & Hartmann 2017) required to define a living laboratory as an urban living laboratory.



Figure 7.1: The three Adelaide Living Laboratory Sites

The research agenda of the Adelaide Living Laboratory was established by the University of South Australia and the Cooperative Research Centre for Low Carbon Living. This included four tasks:

1. Co-creation methodology (this research) — Originally envisioned as the development of a toolkit to support the application of co-creation to projects in the built environment
2. Precinct Tool Case Studies — The application and assessment of a Green Star Communities rating tool
3. Electricity Demand Management — The development and testing of Advanced Precinct Information Modelling (PIM) software to more accurately predict electricity demand
4. Value Propositioning of Low Carbon Living — The investigation of the value of low carbon living elements in homes through a real estate valuation lens. (University of South Australia Research Node for Low Carbon Living 2019a)

Beyond these tasks that sat specifically within the Adelaide Living Laboratory, there were a number of projects that were utilising the Adelaide Living Laboratory sites for research. These include:

- Greening inner urban travel — Investigating the application of sharing economy transport technologies in Adelaide, South Australia
- Photovoltaic/thermal systems for off-grid zero energy homes — Modelling of hybrid photovoltaic and thermal systems in off-grid residential construction
- Maximising renewable energy in small community precincts — Investigating the energy needs and sharing opportunities of retirement communities
- Carbon reduction from composting food waste for food production — Investigation of opportunities for the collection and composting of food waste, as well as the evaluation of carbon savings from its reuse as fertiliser on food crops
- Child friendly precinct design for low carbon living — Exploring the links between precinct design and travel behaviours, particularly focusing on assumptions in precinct modelling tools
- Optimising thermal comfort for two and three storey residential buildings — Developing models to more accurately predict the thermal comfort in upper floors of residential buildings and provide design advice to mitigate overheating (University of South Australia Research Node for Low Carbon Living 2019b)

What becomes evident in these short descriptions is that there is a significant focus on quantitative research and the development of algorithmic models rather than qualitative or social research. To further investigate this, Table 7.1 below aligns

the four Adelaide Living Laboratory tasks as well as the associated research projects utilising the Adelaide Living Laboratory sites with the definitions of the urban living laboratory provided by Barroca et al. (2013) and the Governance in Urban Sustainability Transitions (GUST) group (McCormick & Hartmann 2017).

Table 7.1: Matrix aligning Adelaide Living Laboratory research projects with the definitions of an urban living laboratory by (Barroca et al. 2013) and the GUST group (McCormick & Hartmann 2017)

Project	Situated solutions	Engagement	Social Innovation	Collaborative services	Enabling technologies	Design thinking	Geographical embeddedness	Experimentation and learning	Participation and user involvement	Leadership and ownership	Evaluation of actions and impact
Co-creation methodology (this research)	X	X	X		X	X	X	X	X	X	X
Precinct Tool Case Studies		X			X			X			X
Electricity Demand Management				X	X			X			X
Value proposition or low carbon living		X							X		X
Greening inner urban travel	X	X		X	X		X	X			X
Photovoltaic/thermal systems for off-grid zero energy homes	X				X		X	X			X
Maximising renewable energy in small community precincts	X	X			X		X	X			X
Carbon reduction from composting food waste for food production					X			X			X
Child friendly precinct design for low carbon living	X	X	X				X	X	X		X
Optimising thermal comfort for two and three storey residential buildings	X				X		X	X			X

This table suggests that many of the projects utilising the Adelaide Living Laboratory case study sites did not apply research methodologies that supported the ethos of the urban living laboratory. In particular the concepts of social innovation and design thinking described by Barroca et al. (2013) and participation and user involvement or leadership and ownership described by GUST (McCormick & Hartmann 2017) were not present in much of the research that took place. The lack of consideration of these elements in the design of this research makes the ambition for an urban living laboratory to act as a site for 'testing new forms of democracy' (McCormick & Hartmann 2017) very difficult.

The notion of 'engagement' raised by Barroca et al. (2013) is interesting in the context of these research projects. Many of the projects being discussed featured significant industry-engagement in line with the philosophy of the cooperative research centre program (Government of Australia 2019). However, they also feature little to no end-user or community engagement that might be expected in an urban living laboratory.

Unsurprisingly, the concept of experimentation and learning features strongly across most of the research projects identified. However, the link between this experimentation and the community and user-engagement of the urban living laboratory is notably less prevalent.

The establishment of the sites

The Adelaide Living Laboratory's research programs at Lochiel Park built on previous research at the site. This research had been conducted by researchers at the University of South Australia in partnership with Renewal SA. By contrast, Bowden and Tonsley were newly commenced developments at the formation of the Adelaide Living Laboratory and the research programs relating to these sites were therefore established specifically for the Living Laboratory. All three sites were being developed by Renewal SA in partnership with a range of private developers.

Prior to the formation of the Adelaide Living Laboratory, Lochiel Park had been developed by Renewal SA as a 'Green Urban Village' on land previously used as an education and training centre. This project functioned as a demonstration of the opportunities for high-efficiency housing and challenged the local construction industry to develop housing models that would achieve a 7.5 star National

Australian Housing Energy Rating System (NatHERS) rating (the government-mandated Australian residential energy-efficiency rating scheme). As a part of this development, photovoltaic systems were added to each property and connected through Smart energy meters linked to servers at the University of South Australia's Mawson Lakes Campus. Once the Adelaide Living Laboratory had been established, this site (and the data coming from it) was seen as an invaluable resource for further research into lowering the carbon footprint of suburban development.

In contrast to Lochiel Park, Bowden and Tonsley were both in the very early stages of redevelopment at the establishment of the Adelaide Living Laboratory. The Tonsley site became vacant in 2008 when Mitsubishi Motors abandoned car manufacturing in Australia, while the Bowden site became vacant in 2009 when Clipsal, a large Australian electrical components manufacturer moved to a new manufacturing centre in the northern suburbs of Adelaide.

7.3 From socio-technically-oriented to technically-oriented

One of the key differentiations that emerged from the literature discussed in Chapter 3 was between a socially-oriented living laboratory that treated users as partners and a technically-oriented living laboratory that treated 'the user' as a subject. Franz (2014) highlights that it is common for urban living laboratory projects to focus on the latter, treating users as subjects and focusing on quantitative research approaches. The focus on quantitative research is evident in Table 7.1 above; however, there are also a number of projects (including this one) that use qualitative or social research methodologies.

The social-research component of the Adelaide Living Laboratory was embedded from its foundation, sitting across the three dimensions of the CRCLCL: integrated building systems, low carbon precincts, and engaged communities (Low Carbon Living CRC 2019). Across the four years the researcher was involved in the Adelaide Living Laboratory, however, a significant narrowing of the ambition of the Living Laboratory was observed. Despite the initial ambition to undertake significant programs of social research, over time, the focus appeared to narrow, and, in many ways exclude social research from taking place. This section will explore this shift through the combination of documentary evidence, and reflections from the researcher's journal about the process.

Three key challenges have been identified through the interpretation of the researcher's journal and the documentation evidence:

1. A shift in leadership
2. The continuation and relabelling of existing research
3. A lack of understanding of the co-creation process

These challenges will be explored in more detail in relation to the researcher's journal in sections 7.3.1, 7.3.2, and 7.3.3 before being aligned with an analysis of documentation relating to the project in section 7.3.4. Section 7.4 will then link these results with the living laboratory literature to situate these experiences within the living laboratory literature.

7.3.1 A shift in leadership

The Adelaide Living Laboratory was established with a steering committee and a laboratory manager that was responsible for the day-to-day running of laboratory activities as well as liaising between industry and academic participants. The manager was from an industry background and sat outside of the various partner organisations.

In 2016, the Adelaide Living Laboratory was moved from being a standalone organisation funded by the CRCLCL to a part of the Research Node for Low Carbon Living at the University of South Australia. The membership of the steering committee remained largely unchanged, but the laboratory manager was replaced with a senior academic from the University of South Australia.

The reasons behind the leadership changes are outside of the researcher's knowledge and the impact of the change was not immediately apparent. However, the subsequent failure to gain traction on a number of projects and initiatives that had commenced under the previous leadership, and the repeated refusal to accept research reports that were written without "appropriate scientific rigor" appeared to be linked with a general shift toward research based in the physical rather than social sciences and therefore using quantitative rather than qualitative research methodologies.

As an example, the description of this project in section 7.2 establishes that its purpose was to develop and test a toolkit for applying co-creation to projects in the built environment. This toolkit was created by the researcher in partnership with

the supervisory team using a desktop survey method. A distribution plan was established and an online survey created to allow the researcher to gain feedback on the application of various tools to the facilitation of co-creation processes in built environment projects around Australia. A number of researchers within the CRCLCL had agreed to provide feedback on the application of the various tools within their projects, however, a block emerged somewhere within the leadership structure of the Adelaide Living Laboratory that meant this toolkit was never able to be shared. Repeated efforts were made by the researcher, the supervisory team (who were themselves members of the Adelaide Living Laboratory leadership group), and the industry leader for the Adelaide Living Laboratory to have the toolkit and survey launched without success. It remains unclear how and at what level this part of the project was blocked, but the toolkit, along with a literature review and a report detailing the methods used in its establishment were never made public.

The purpose of this example is not to suggest that the research was in any way compromised but instead to illustrate how the change in leadership might be linked with a general shift in the operation of the Adelaide Living Laboratory. The research report and literature review were approved by the original manager and by the steering committee, but, were not accepted by the incoming manager of the Laboratory. The reasons given for the rejection were based on methodological concerns including the use of a desktop-survey-based literature review rather than a systematic literature review. The quality assurance and peer-review process is of course very important, however, the previous acceptance of the research by the steering committee and the living laboratory manager, and the focus of the criticism on the methodological approach (that is widely accepted in social research) rather than the specifics of the report, suggest the new leadership structure was driving a significant shift in the operation of the living laboratory.

The shift that became evident over the subsequent years was that research considered successful by the living laboratory management was focused on developing technological solutions and driving carbon reduction through demonstrable gains in energy efficiency. This, and the other challenges that will be identified later in this chapter resulted in the abandonment of the Adelaide Living Laboratory as a site for the main case study of this research. Instead, the main case study (presented in Chapter 9 and Chapter 10) was established through a project

that had connections with some members of the steering committee but was outside of the control of the Adelaide Living Laboratory management.

7.3.2 Continuation and relabelling of existing research

The Adelaide Living Laboratory was able to establish a strong starting point for its research and to utilise an existing network of researchers by being constructed around the Lochiel Park development which had already been the subject of significant research into energy efficient housing. This approach however, also meant that many of the methodological approaches that had been used in Lochiel Park (prior to its inclusion in the Adelaide Living Laboratory) were carried through into Adelaide Living Laboratory research projects.

Despite Lochiel Park being named as a site of the Adelaide Living Laboratory, the research that took place was not necessarily aligned with the structure required by an urban living laboratory (McCormick & Hartmann 2017). Key elements that are noted as being absent from the research approaches at Lochiel Park are highlighted in Table 7.2 below. These include the use of design thinking as a methodological framework and a focus on social innovation alongside technological innovation (Barroca et al. 2013), as well as participation and user involvement, and leadership and ownership (McCormick & Hartmann 2017).

Table 7.2: Matrix aligning the Lochiel Park development with the definitions of an urban living laboratory by Barroca et al. (2013) and the GUST group (McCormick & Hartmann 2017)

Site	Situated solutions	Engagement	Social Innovation	Collaborative services	Enabling technologies	Design thinking	Geographical embeddedness	Experimentation and learning	Participation and user involvement	Leadership and ownership	Evaluation of actions and impact
Lochiel Park	X	X			X		X	X			X

The conceptualisation of the residents as subjects rather than partners established in the original research continued as the site was transitioned to be a part of the Adelaide Living Laboratory. This means that despite the residential population signalling an interest in being a part of the research, there were no structures in place for them to participate. As an example, while walking through the neighbourhood during a site visit with a group of undergraduate students led by the researcher and a member of the project steering committee, the group happened upon a resident that was working in his front garden. This resident then invited the students to come inside their home and to "experience the quality of a 7.5 star (NatHERS) home". During the ensuing discussion, the resident expressed his keen interest in being a part of the research that was taking place, and produced a spreadsheet cataloguing the data he had been collecting himself about the thermal comfort and energy performance of his home.

The research that occurred at Lochiel Park prior to the establishment of the Adelaide Living Laboratory was focused on driving energy efficiency through technology. This meant occupant-led efficiency was treated as a disruption in the data rather than being celebrated as a success and investigated. Where users might have developed innovative ways of reducing energy use or improving thermal performance of their dwellings, it is likely that this would have been treated as outlying data that in some cases would be ignored rather than interrogated.

With the establishment of the Adelaide Living Laboratory, it was assumed there would be opportunities to engage residents, treating them as lead-users (Von Hippel 1986), or as potential informants, testers, contributors, and co-creators (Nyström et al. 2014). However, when an element of co-creation was suggested in relation to research at Lochiel Park, concerns were raised about the impact on the reliability of longitudinal data being collected. Because of the way the research was originally designed, there is a very strong case for continuing to collect data based on 'everyday behaviour' at Lochiel Park. Any efforts to have residents actively reducing their consumption could be seen as compromising the longitudinal data.

At the same time, the researcher was also pointed to a previous study (Berry et al. 2014b) that had explored the social dimensions of the Lochiel Park experience as evidence of social research taking place. This study used a series of semi-structured interviews to collect data from residents about their experience of

purchasing and living in high-efficiency housing. Although this research used social research methods, it was asking the residents to reflect on past decisions rather than contribute to the co-creation of an outcome.

Had Lochiel Park been established as an urban living laboratory site from its inception, the approach taken to research may have been somewhat different. It is assumed that the research would have incorporated most if not all of the elements described in Table 7.2 (page 157). Based on this, the researcher did tentatively propose a project that would have engaged with the existing residential population of Lochiel Park, co-creating a series of design and/or purchasing guidelines for future high-efficiency housing projects. This was not taken forward by the Laboratory management.

It is not surprising that the elements of the urban living laboratory that are identified as missing in Table 7.2 (page 157) are the same as those identified as missing in Table 7.1 (page 152) because many of the research projects described in Table 7.1 relate to the Lochiel Park site. What is perhaps surprising however, is that this also means the elements of an urban living laboratory that were identified as missing in the research at Lochiel Park (Table 7.2) were also missing in projects at the other Adelaide Living Laboratory sites (Table 7.1).

This can be perhaps explained by the continuity of researchers across the three sites, from the original Lochiel Park research into the research at Bowden and Tonsley. For example, the researchers that undertook the energy-use modelling at Lochiel Park then undertook similar modelling for Bowden and Tonsley. By using the existing research as a stepping off point, the Adelaide Living Laboratory inherited a strong research foundation, but, this foundation may have contributed to the perpetuation of methodological approaches that contradict the urban living laboratory approach. Interestingly, this also links back to the discussion in the previous section with the senior academic that assumed the leadership of the Adelaide Living Laboratory having been closely associated with the success of the original Lochiel Park project.

7.3.3 Lack of understanding of the co-creation process

This research commenced with a proposal to test how co-creation as a framework could connect research with industry and community groups in an ongoing and collaborative dialogue. The experience of being involved in the living laboratory

however, uncovered a general lack of understanding of what co-creation meant and a number of difficulties in shifting toward this way of working. The most common attitude encountered was that co-creation was a form of user-testing that gathered user-feedback rather than ideas.

The challenges associated with the distribution of the draft co-creation toolkit (discussed in 7.3.1) were also symptomatic of this conception with significant difficulty in communicating the intention to co-create the co-creation toolkit with its end-users (other facilitators). The assumption that a toolkit should be a finished document rather than a work in progress is assumed to be one of the reasons why it was never released.

As suggested in the previous section, the conception of users as subjects rather than as partners was not isolated to the Lochiel Park site and also appeared in discussions about potential projects at the other Adelaide Living Laboratory sites. In early 2016, a meeting took place with the sustainability manager of the Bowden development within Renewal SA (who also held a position within the Adelaide Living Laboratory steering committee), the researcher, and the supervisory team to discuss a potential case study opportunity. At this meeting the researcher was introduced to plans to develop a number of highly energy-efficient townhouses on the Bowden site. It was proposed that the researcher could "do some co-creation" as a part of this development.

This was seen as an exciting opportunity and the discussion quickly shifted to ideas for how community members and potential occupants of the townhouses could come together to co-create the project. It was anticipated (in line with the discussions in Chapter 3 and Chapter 4) that the co-creation process could facilitate better quality design, as well as social learning for participants. These ambitions were quickly halted however, when it was disclosed that the townhouses had not only been designed and tested through virtual models, but that their construction was scheduled to commence the following week.

To the credit of the sustainability manager involved in this discussion, subsequent opportunities that were brought to the attention of the researcher were at a slightly earlier stage of design consideration. Unfortunately however, it became clear that because of the position they held within Renewal SA they found out about the detail of projects at a point in time that was too late to shift the process away from

an industry standard view of consultation taking place as a part of government approval (discussed in section 5.2).

Much of this challenge can be linked with the broader structures of the construction industry and the conservatism associated with risk management. For instance, the appointment of a developer for the Tonsley site was kept confidential by the Government of South Australia for many months; and, where plans were developed by this developer, they were considered commercial in confidence and therefore not able to be explored as a part of a co-creation process with a broader range of stakeholders. Reflecting on both Forester (2013) and Sennett (2012), these processes can be seen as privileging one form of knowledge (that is strongly linked with risk management) over the social and cultural knowledge that could have been incorporated had a critically pragmatic or dialogic co-creation approach been taken.

7.3.4 Documentary evidence

The previous three sections have discussed ways in which a shift in leadership, the continuation and relabelling of existing research, and the lack of understanding of the co-creation process can be linked with a shift from a socio-technically focused living laboratory to a technologically focused living laboratory. These sections have relied on data from the researcher's journal about the experience of the Adelaide Living Laboratory. In order to test the validity of these observations, the information presented in these sections will be compared with documentary evidence that is available from the project.

Three sources of documentation have been selected for this analysis:

- a series of public statements made at the inception of the Adelaide Living Laboratory project in 2014
- a 2018 description of the Adelaide Living Laboratory project by the CRCLCL
- a 2018 description of the Adelaide Living Laboratory project by the University of South Australia Research Node for Low Carbon Living.

A summary of the text from these three documents is provided in Table 7.3 below.

Table 7.3: Descriptions of the Adelaide Living Laboratory in 2014 and 2018

Text A: Cooperative Research Centre for Low Carbon Living 2014	**Text B: Cooperative Research Centre for Low Carbon Living 2018**	**Text C: University of South Australia Research Node for Low Carbon Living 2018**
The Laboratory will be an innovative research hub designed to investigate ways to lower carbon emissions in our built environment. The four year venture is an action based research project located across three key development sites at Tonsley, Lochiel Park and Bowden where **community, industry and university participants will undertake on site research.** The unique program will help **provide better understanding of low carbon living**. It allows industry and the community to draw their research from current development sites to help shape the future of low carbon living and design both in South Australia and across the country. (Cooperative Research Centre for Low Carbon Living, 2014)	The project involves the establishment of the Adelaide Living Laboratory to deliver the research agenda across the three living laboratory locations (Tonsley, Bowden and Lochiel Park) in Adelaide **through a co-creation methodology**. This is consistent with the requirements and intent of the CRCLCL living laboratory program. As such, the emphasis is on **engaging the diverse communities** of the three sites and **developing low carbon solutions with demonstrated outcomes for a diverse range of infrastructure and users** . . . The project is **an action research project that will inform communities and the building, construction and development industries**. It will provide an evidence base that can then be rolled out nationally to enable significant reduction of carbon emissions of the building and construction development sector and urban communities	The Adelaide Living Laboratory venture is an action based research project . . . drawing evidence from three key Adelaide development sites at Tonsley, Lochiel Park and Bowden. Each of these sites has been established **to meet specific government policy objectives**, is physically created by the local building and construction industry, and incorporates data collection and analysis by the University of South Australia. The Adelaide Living Laboratory project utilises the **expertise and skills of community, industry and university participants** to undertake site-specific research to **build a stronger evidence base** supporting government policy and planning, and industry delivery. An urban living laboratory is typically a location or set of locations that have been created with the following principles: Collaboration: **the precinct is co-design** (sic) **by multiple collaborators.** This is typically a collaboration of government, industry, academia, and end users. Exploration: the precinct is seeking to address a set of issues. Typically the issues may be environmental, social or economic challenges. Experimentation: the precinct includes the testing of new technologies, systems, services or behaviours in live scenarios within communities of users. Evaluation: the project explicitly seeks to assess new technologies, systems, services or behaviours with the purpose of providing detailed feedback to industry, government and end-users. Communication: the project is designed to communicate the new knowledge to industry, government and the wider community.

Each of the statements describe an ambition to lower carbon emissions in the built environment. Text A references open processes for *investigating ways to lower carbon emissions* and social learning processes to *provide better understanding of low carbon living*. Texts B and C are much more pragmatic, referring to *developing low carbon solutions* and meeting *specific government policy objectives* respectively. These statements directly relate to the challenges introduced in Chapter 2.

Interestingly, specific differences between the statements are not evident when aligning these statements with the frameworks for the classification of an urban living laboratory of Barroca et al. (2013) and the GUST group (McCormick & Hartmann 2017) (Table 7.4 below). Here, all three statements can be read as covering much of the same information, touching on the situated or geographically specific nature of the research, some element of engagement (particularly industry engagement), the development of collaborative processes, a commitment to experimentation and learning, some element of user involvement, and an approach based on evaluating impact.

Table 7.4: Matrix aligning the descriptions of the Adelaide Living Laboratory (Table 7.3) with the definitions of an urban living laboratory by Barroca et al. (2013) and the GUST group (McCormick & Hartmann 2017)

Document	Situated solutions	Engagement	Social Innovation	Collaborative services	Enabling technologies	Design thinking	Geographical embeddedness	Experimentation and learning	Participation and user involvement	Leadership and ownership	Evaluation of actions and impact
Text A: Cooperative Research Centre for Low Carbon Living 2014	X	X		X			X	X	X		X
Text B: Cooperative Research Centre for Low Carbon Living 2018	X	X		X			X	X	X		X
Text C: University of South Australia Research Node for Low Carbon Living 2018	X	X		X			X	X	X		X

Therefore, in order to explore some differences between these statements a Critical Discourse Analysis process (Fairclough 2013) has been used. This is not intended as a thorough analysis; it is intended only to explore whether the researcher's observations of changes in the Adelaide Living Laboratory are in any way evident in published documentation. The analysis satisfies Fairclough's (2013) three criteria for Critical Discourse Analysis because:

- it links the shift in discourse with the social experiences and observations of the researcher
- it compares texts with similar purpose in a systematic way, and
- it uses the analysis as a way of demonstrating that a significant shift may be demonstrable in the approach of the Adelaide Living Laboratory.

The highlighted text (bold) in Table 7.3 can be linked with the reflective descriptions of how the approach to living laboratory research changed over time as discussed in sections 7.3.1, 7.3.2, and 7.3.3.

The transition to a technically-oriented living laboratory focusing on empirical evidence described in section 7.3.1 is particularly evident in the difference between Text A and Text C. In Text A the research is described as a highly collaborative process with the community suggested to be working with industry and academia. The description in Text C of testing products or services *within* rather than *with* communities of users suggests the user is separate from the industry and university participants and considered a subject rather than a partner.

The focus on open-ended and inquisitive processes in Text A perhaps reflects the openness of the research and collaboration agenda at the establishment of the Adelaide Living Laboratory, while the references to solutions and outcomes in Text B and a specific relationship with public policy described in Text C align with a more quantitative and defined research agenda. Although this supports an argument about a shift in the Laboratory agenda, it can be attributed, at least in part, to the shift from defining an ambition in 2014 to describing outcomes in 2018.

It is not possible to use these documents and Critical Discourse Analysis to draw conclusions about any link between the pre-existing research projects at Lochiel Park and the research of the Adelaide Living Laboratory as discussed in 7.3.2. However, the analysis above does support the observations presented in section 7.3.3.

As evidenced in Table 7.4 above, all three texts reference an ambition to undertake on-site research, and to engaging with community, industry and academia. This can be seen as embodying two of the key principles of urban living laboratories and co-creation. A closer examination of the texts, however, reveals a separation between researchers and users in both Text B and Text C. This can be seen as aligning with the lack of understanding of co-creation described in 7.3.3. The equal treatment of *community, industry and university participants* in research activities described in Text A was replaced in Text B with *an action research project that will inform communities and the building, construction and development industries* and in Text C with using the *expertise and skills of community, industry and university participants* to *build a stronger evidence base*. The term co-creation was not specifically referenced in Text A but it is implied through the suggestion that participants from the community, industry and academia are treated as equal partners. By contrast, Text B specifically talks about delivering the research agenda *through a co-creation methodology*. It (Text B) then however, contradicts some elements of co-creation described in Chapter 4 through the establishment of a separation between the processes of research and knowledge sharing. Text C provides a specific description of the collaborative process with a description of how urban living laboratories typically operate, stating that *the precinct is co-design* (sic) *by multiple collaborators* but does not discuss the co-design or co-creation process in detail.

7.4 Discussion

The shift toward a technological and empirical focus in the Adelaide Living Laboratory does not compromise its success or classification as a living laboratory, nor impact its membership in ENOLL. Instead, the shift in direction shows how the Laboratory shifted from an ambition of creating a socially-oriented living laboratory to the reality of creating a technically-oriented living laboratory (Franz 2014). Franz (2014) suggests it is very common for urban living laboratories to be grounded in the methodological approaches of the physical sciences rather than the social sciences. Because of this, the reflections presented in the previous section should not be read as a criticism of the Laboratory, but instead as an exploration of the processes that occurred with a view to how they informed this research.

As a whole, the projects within the Adelaide Living Laboratory broadly conform to the structure of an urban living laboratory as described by Barroca et al. (2013)

and the GUST project (McCormick & Hartmann 2017). In particular, the selection of sites of urban-renewal as a part of the Adelaide Living Laboratory, and the establishment of a program of research based on co-creation is in line with the suggestion that urban-renewal developments (expressed as spatial/area development) should be situated alongside actions to build community resilience and develop new mobility and energy solutions (McCormick & Hartmann 2017). There is also significant evidence of collaboration between government, industry, academia, and end-users, satisfying the quadruple-helix model of living laboratories described by Arnkil et al. (2010).

The research that took place at Lochiel Park prior to its inclusion in the Adelaide Living Laboratory can be linked with the MIT Home Lab experiments that were introduced in section 3.1 (Robles et al. 2016). One of the key differences in the Lochiel Park experience, however, was that rather than transplanting users into a monitored environment and asking them to behave as they normally would, the technology was transplanted into the users' environment. This approach is assumed to overcome the Hawthorne effect (Landsberger 1958), and allow a more accurate behaviour profile to be studied. Both the Home Lab and Lochiel Park experiments however, can be seen as treating the users as subjects rather than partners (Eriksson, Niitamo & Kulkki 2005), that is, passive actors to be studied rather than active participants in the co-creation process.

Shifts in leadership and research from sociotechnical to technical

The literature reviewed as a part of this research does not discuss the impact of shifts in the leadership of living laboratories. However, the changes in the Laboratory described in 7.3.1 and 7.3.4, align closely with the two models of living laboratory described by Franz (2014). Franz (2014) suggests that the entrenchment of an urban living laboratory in the methodologies of the physical rather than social sciences is very common. However, she describes a general shift away from technology and energy efficiency led living laboratories and toward socially centred living laboratories. This is the opposite of what was observed in the Adelaide Living Laboratory case.

The early experiences of the researcher as well as the documentation relating to the establishment of the Adelaide Living Laboratory project suggests there was an ambition to shift away from technology and efficiency focused research and to engage in some form of social innovation. The focus on energy efficiency and

technological innovation aligns with the approach advocated for by the International Energy Agency (2012).[49] It does not however, align with the kinds of social innovation processes described in the later parts of Chapter 2.

Locking in methodologies

The observed shift from a social orientation to a technological and efficiency orientation is assumed to be linked with the changes in the Adelaide Living Laboratory leadership. However, as discussed in 7.3.2, this shift can also be linked with the Laboratory's use of a pre-existing research project as one of its sites. Examples of previous research at Lochiel Park include demonstrating net zero energy homes in warm temperate climates (Berry et al. 2014c), how niche green developments can catalyse a transition in the construction industry (Berry, Davidson & Saman 2013), and the value of a shift toward low-energy housing models (Berry et al. 2014a; Berry et al. 2014c). Its inclusion in the Adelaide Living Laboratory project, however, can be seen as locking-in a series of assumptions about the research that could, and perhaps also should, take place. For example, Berry and Davidson (2016) builds on Berry et al. (2014b) to deliver further granularity in the body of evidence. While this is good research practice, it also demonstrates how the research methodology transferred from previous research into Adelaide Living Laboratory research. Some similarities may be drawn with the literature discussing interdisciplinary collaboration in section 4.3, but, as with changes in leadership in living laboratories, the perpetuation of research methodologies when bringing existing projects into living laboratories is an area that would benefit from further research.

The evidence gathered through the researcher's involvement in this case suggests that the research did not significantly leverage or engage with the passion and enthusiasm of the occupants of the Lochiel Park properties. The anecdotal evidence appears to suggest that lead-users (Coorevits, Lyn, Schuurman & Herregodts 2013; Von Hippel 1986) had emerged, despite this type of behaviour being discouraged.

The multiple interpretations of how a co-creation process is structured that were discussed in 7.3.3 align with the discussion in the literature about the lack of

[49] This was discussed in section 2.3

definitional specificity. This demonstrates the difficulty in understanding the relationship between the living laboratory and co-creation discussed in section 4.1, and in understanding the definition of co-creation discussed in section 4.2. In this case, the openness of the definition of co-creation and the interchangeable nature of the terms co-design, co-creation and co-production highlighted by Sanders and Stappers (2008) can be linked with the relative lack of understanding of the co-creation process. Had for example, the description by Cottam and Leadbeater (2004) been better understood (introduced in section 4.2 and repeated below), many of the discussions based on "doing some co-creation" may have been avoided.

> Co-creation is not a one off event, like a referendum in which the community decides what should be done . . . Nor is co-creation just a question of formal consultation in which professionals give users a chance to voice their views on a limited number of alternatives. It is a more creative and interactive process which challenges the views of all parties and seeks to combine professional and local expertise in new ways (Cottam & Leadbeater 2004, p.22).

The experiences introduced as a part of this case suggest that co-creation was perhaps viewed by many in the Adelaide Living Laboratory as a method rather than a methodology. In instances where co-creation was embraced as a methodological approach (such as a project that will be discussed as Case B), the group of professional and academic participants was comparatively small. Interestingly, this brings these instances more in line with the complexity of a living laboratory rather than an urban living laboratory. This point will be further expanded on in the discussion of this case in Chapter 8.

A social practice lens

Chapter 2 introduced Social Practice Theory as a framework for understanding macro-scale behaviour change (Shove, Pantzar & Watson 2012). In Social Practice Theory parlance an urban living laboratory focused on technology and efficiency-based solutions focuses specifically on the material dimension of practice (Shove, Pantzar & Watson 2012). As discussed in 2.7 this makes these interventions unlikely to create landscape-level change (Geels 2002).

The example of the longitudinal research that has been continued at the Lochiel Park site under the Adelaide Living Laboratory demonstrates the way in which some research methodologies can establish the meanings and skills dimensions of practice as variables that need to be controlled. This allows the statistical significance of the research to be ensured, but also limits the opportunities for the

research process to catalyse social innovation. The focus on optimisation aligns strongly with the technological approaches described in section 2.3 where the exclusion of user behaviour through automation was described as ensuring optimal operational performance (Shaikh et al. 2014).

There are of course exceptions to this generalisation, including a project briefly described in 7.3.2 where residents were surveyed about their attitudes toward purchasing and living in a low-energy home (Berry et al. 2014b). In this instance, the research focused on the meanings dimension of practice. By taking a historical approach however, the research was focused on evaluating the meanings dimension and did not appear to engage with the materials or skills dimensions of practice.

7.5 Conclusion

This chapter has provided an overview of the researcher's experiences of working within an urban living laboratory. These experiences have been used to explore some of the challenges associated with applying co-creation as a methodology to projects in the built environment. It should again be reiterated that the challenges described relate to the application of co-creation as a methodology, not to the success of the Adelaide Living Laboratory or its ability to operate as a living laboratory.

In this case, an apparent shift away from co-creation as a methodological framework in favour of technology-based or efficiency-driven research has been documented to understand some of the factors that may have contributed to this shift. The understanding of these factors provides a series of key insights into the conditions required for the application of co-creation to projects in the built environment.

The three key factors that have been identified as contributing to the shift from a socially oriented to a technology and efficiency oriented urban living laboratory are:

1. A shift in leadership
2. The continuation and relabelling of existing research
3. A lack of understanding of the co-creation process

In line with Grounded Theory, this research responded to these experiences by adjusting its direction. Rather than focus only on ‘how’ a project can use co-creation as a methodology as was the initial intent, the experiences documented in this chapter informed the development of a second research question that explored ‘why’ a project would use co-creation as a methodology.

The results of this shift will be seen primarily in Case C where the Value Network Analysis method has been used to explore the value of co-creation processes in more detail. The next chapter (Case B) presents the findings from an early case study that was conducted during the leadership transition that was described in this chapter.

Chapter 8 Case B: Parklands Community Garden

This chapter presents the second case, the Parklands Community Garden. The case is presented through a range of documentary and experiential evidence, describing the researcher's involvement as well as the case more broadly. It begins by introducing the project and the relationship between this project and the previous case study (Case A: The Adelaide Living Laboratory), before describing the process and findings from three co-creation workshops.

The chapter then discusses the findings from these workshops in the context of some of the key discussions in previous chapters. This includes the relationship between niche-scale action and regime-level change (introduced in Chapter 2), and the challenge of mitigating the positional power held by a professional designer (in this case a town planner) in a co-creation process (discussed in Chapter 5).

Finally, the conclusion documents the key findings from this case, including the theories that were emergent before briefly introducing how these findings informed the development of the approach to Case C.

8.1 Project Introduction

The Parklands Community Garden project was initiated by Renewal SA as a part of the development of the Bowden site of the Adelaide Living Laboratory. The Garden is situated in existing parklands opposite the Bowden development (see Figure 8.1 on next page). The Garden was initially intended to be a large (11,000m^2) orchard and market garden that would be accessible to the community, but was revised to be a smaller (1,800m^2) community garden after soil contamination and other issues emerged.

Planning for the co-creation process that is the subject of this case study commenced in mid-2015 and the garden was officially opened on 30 July 2016. The name of the garden was changed to the Park Terrace Community Garden, but for consistency it will be referred to in this thesis as the Parklands Community Garden.



Figure 8.1: The Parklands Community Garden site location

The aim of the Parklands Community Garden project for Renewal SA was to replicate the success of the community garden project at Lochiel Park. In the initial stages of the Lochiel Park development, Renewal SA hosted a number of formal and informal social gatherings to discuss sustainability and establish a community garden. These gatherings have been linked (by Renewal SA) with the development of a strong sense of community. Once the Lochiel Park development was more established, Renewal SA stepped back from the active facilitation of community gatherings and community projects, leaving the community to self-organise. Since this withdrawal, the community has developed a public book exchange program and continued hosting regular social gatherings.

For Renewal SA, the co-creation process of the Parklands Community Garden was envisaged as a repeat of the Lochiel Park process, building an initial user-group that they hoped would over time take on the organisational and administrative tasks associated with running the garden. There were however, a number of significant differences in the Parklands Community Garden. These include the use of public rather than private land, and the fact that participants were invited from a number of existing communities, rather than being developed alongside the establishment of a new community.

Funding for the construction materials for the garden and for a professional design consultant (town planner) was provided by the Government of South Australia, construction labour donated as a part of a work-skills development program, and a number of Renewal SA staff were given time to help coordinate the project. Co-creation workshops were facilitated by the researcher in partnership with Renewal SA as a part of the design process. Some participants were present at all three workshops while others only attended one or two of the workshops.

In line with the ethics approval for this research, participants were recruited by Renewal SA through invitations placed in letterboxes in surrounding properties. After the initial responses, a snowballing recruitment process was used to increase the number of responses. A snowballing recruitment process works with the social and professional networks of participants and allows continuous adaptation and development to suit the needs of both participants and the challenge at hand. A snowballing recruitment process functions by starting with a small network of initial participants, then using networks of these participants to expand the recruitment process. The snowballing recruitment process is particularly useful in

gathering participants in small populations and is able to use interpersonal networks to motivate participation and uncover participants that would not normally have been reached by a research process (Denscombe 2014). The snowballing recruitment process does not provide a random sample, but in this case random sampling would not be useful. By engaging participants through interpersonal networks, it is likely that some of the motivations discussed in section 5.4 (such as reciprocity, social validation, commitment and consistency, and friendship and liking) helped encourage greater engagement.

8.2 Co-Creation Workshops

This case study featured three co-creation workshops across November and December 2015 that were facilitated by the researcher and the community engagement manager from Renewal SA. These workshops were broadly conceived as a visioning workshop, a design workshop and a rationalisation workshop.

8.2.1 Workshop One (Vision)

The first workshop took place on 14 October 2015 from 5:30pm until 7:00pm at 'Plant One', Bowden, a short distance from the proposed community garden site (Figure 8.1 on page 173). The workshop was attended by two representatives from the Adelaide City Council (the local government responsible for the site), three staff from Renewal SA, the town planner, 12 members of the local community and the researcher.

The workshop was divided into four sections: a welcome and introduction, a series of presentations by various professional representatives to set-the-scene, a number of future visioning co-creation exercises, and a wrap up discussion of next steps for the project. The outcomes from this workshop were presented back to participants in a report that is included in Appendix A.1.

Presentations at the beginning of the workshop gave an overview of the history of the site, the relationship between the site and local and state government legislation, some facts about soil contamination and other limitations of the site, as well as information about using the construction of the garden as a Live Training Site Opportunity.

In this workshop the co-creation exercises were facilitated using a Seasons exercise based on the principle of 'appreciative inquiry', a picture card discussion

based on the ‘card sort’ method, a future visioning exercise based on the ‘back-casting’ method, and a self-assessment of expertise exercise based on a ‘resources’ exercise. These four tools were selected by the researcher in consultation with the Community Engagement Manager at Renewal SA because they were seen as providing an easy entry point into the co-creation process for participants, and because it was hoped they would begin to build commitment to actions associated with the project.

Discussion: Workshop One (Vision)

The workshop was generally well received by community participants and although there was some discontent expressed with regard to the limitations brought about by the project site, this was expressed as a disappointment with the history of the site rather than with the co-creation process. All participants were able to successfully engage with the first two activities. The appreciative inquiry basis of the Seasons activity helped to create a very positive environment for the card sort activity that followed. Most participants appeared to find it easy to engage with both of these activities with minimal intervention required by the facilitation team.

The third activity was more difficult. Participants appeared to struggle with being asked to describe ideas that were “not realistic”, “never going to happen”, or “a dream”. This may be related to assumptions made by the facilitator about participants’ design literacy. The first two methods were straightforward questions about what people liked or were drawn to. Asking participants to imagine a future that was not likely to be realised and describe ideas through abstraction was a difficult step without introduction. Abstraction is a process that is very common in design and allows designers to work with metaphor and conceptual language to uncover hidden meanings and ambitions. The assumption that community members would be able to engage in this without careful instruction led to some discomfort for participants and a reluctance to engage. Viewing this through the lens of Flow (Csikszentmihalyi 2014; Nakamura & Csikszentmihalyi 2014), this activity introduced a challenge without providing participants with adequate skill to engage.

The final activity brought the discussion back to the individual skills and expertise that were present within the group. The surface-level aim of this discussion was to begin to create a list of skills that could be used to develop and run the community

garden organisation, but the underlying goal was to encourage participants to invest something of themselves in the process to begin to build a sense of ownership and commitment.

The outcomes from the workshop activities were varied, with some high-level vision around the ambition for the garden developing during the picture card activity, some initial ideas about what the garden might contain emerging in the back-casting activity, and a list of skills emerging from the resources activity. From the information gathered during this workshop, the town planner began to sketch some initial ideas for how the garden might look while the facilitation team took the experiences and used them to refine their approach for the second workshop.

8.2.2 Workshop Two (Design)

The second workshop took place on 11 November 2015 from 5:30pm until 7:00pm, at 'Plant One', Bowden, a short distance from the proposed community garden site (Figure 8.1 on page 173). The workshop was attended by four staff from Renewal SA, the town planner, eight members of the local community and the researcher.

The workshop was divided into three main sections, a recap of the discussion in workshop one, a series of themed small group discussions, and a hands-on co-design activity. The outcomes from this workshop were presented back to participants in a report that is included in Appendix A.2.

Three of the community participants in the second workshop were present at the first workshop, while five were not. This made it important to present an overview of the first workshop, including the process as well as the findings as a starting point for the second workshop. The themed small group discussions were facilitated around "sustainability", "coming being and going", "beyond the plants", and "materiality" using the world-café method. The co-design session was facilitated using a shared large format site plan at 1:100 scale. As with the first workshop, these tools were selected by the researcher in consultation with the Community Engagement Manager at Renewal SA.

Discussion: Workshop Two (Design)

The recap discussion began with the facilitators describing the process from the first workshop and encouraging participants who were present to also describe their experiences. The participant-led explanations were important because they began to establish rapport between participants, and because they reinterpreted the knowledge from the first workshop through a community rather than professional lens (Forester 2013).

A short presentation was made by the town planner who had been tasked with taking the conceptual discussion from the first workshop and turning it into a series of initial conceptual sketches. Unfortunately, very few (if any) links could be found between the outcomes from the first workshop and the designs that were presented. This was quickly noticed by the facilitators and described to participants and downplayed as being 'just one possible response' before moving on to the other activities. This was the first occasion in this case study where a significant disconnect between professional and community emerged.

The small group discussion topics aimed to help participants broaden their thinking beyond the obvious focus of a community garden — plants. The "coming being and going" discussion focused on how the garden would fit into a daily or weekly schedule and how it might be paired with other activities. This enabled sharing about the forms of transportation used by participants, including one sharing their experience of 'go get', a car sharing service that is available in the local area. It also began a discussion about other stakeholders that might become involved in the garden over time, expanding the system boundaries to include local schools, friends and family, and the general community. The desire for a stronger sense of community was also expressed during this discussion and ideas for how this might happen began to flow.

The "sustainability" discussion asked participants to reflect on the resources that would be required for the garden, how it might become self-sufficient, and how it might encourage the local community to think more critically about how they live their lives. This discussion was led by the sustainability manager of Renewal SA, and some very different levels of understanding of what constituted sustainability emerged. For some participants, sustainability was about highly visible elements such as rainwater tanks for water capture and storage, windmills for water pumping, and solar panels for lighting, while for others it was about establishing

circular-systems or embedding permaculture principles in to the garden. This was an interesting counterpoint to the data-driven energy-performance approach taken to sustainability in the neighbouring Bowden development, and began to highlight the opportunity for social learning to take place, both in workshop settings and through ongoing engagement with the community that was being established.

The “materiality” discussion was in many ways similar to the “sustainability” discussion but was largely limited to specific materials and technologies rather than a discussion of how the elements being suggested related to principles of upcycling, reusing, or recycling. This was interesting because this link was able to be made during the discussion about general sustainability. One of the participants suggested that the discussion was somewhat trivial because the decisions about materials would be made by the person designing the garden and those constructing the garden. Because the design and construction were seen as being separate from the role of the community, this may have impacted the participants’ ability to think of this as their role. This separation of responsibility is somewhat problematic in a co-creation process and is reflective of the perception of a hierarchy between the community and professional participants. This comes back to the discussion on positional power in section 5.4.1 and highlights how the assignation of ‘professional’ versus ‘community’ roles can disempower community participants.

The final topic, “beyond the plants”, was intended as an open-ended discussion on what other functions a community garden might have and what roles it may play in supporting the community. This discussion quickly became a “wish-list” and although the ideas were discussed, more richness would have emerged had the discussion shifted to considering the themes behind each idea, rather than focusing on the expression of the idea itself. This is a technique that was developed by the researcher later in the PhD in response to this and other similar experiences.

During the small group discussions, it was noted by the Renewal SA facilitator that two children that had come along were struggling to engage with the topics. Rather than shifting the discussion topics or allowing the children to become disengaged, the picture card activity from the first workshop was repeated. This was possible because these participants were not present at the first workshop, and because it provided an opportunity to capture a perspective that was not represented in the previous session. The results of this were presented in the

second workshop report under the heading “young experts” as a way of differentiating their responses from those of the first workshop participants and giving value to the previously unseen perspective.

The co-design activity was generally successful with participants engaging with the physicality of the model and beginning to move beyond the notion of the community participants being ‘lesser than’ the professional participants described above. Although a series of printed illustrative garden bed layouts were provided as discussion prompts, these were quickly cut out by participants and added to the model. The physical forms suggested in these prompts became the only physical forms that were being considered.

Based on the experiences of the first workshop, the concept of a plan drawing at scale was illustrated by taping a large ruler onto the ground of the workshop space with marks at each meter. Participants were then able to take elements of the model, estimate their size in centimetres, and ‘step-out’ their length along this ruler.

The outcome from this short co-design exercise was two annotated plans that were passed to the town planner for refinement and translation into constructible working drawings. One of the major limitations of this approach was that the plans were not connected in a way that facilitated decision making. This left the town planner with the responsibility to make value judgements about which ideas were better or worse. As an example, two locations were suggested for the placement of the storage shed, but because of time pressures this difference was not discussed during the workshop session.

8.2.3 Workshop Three (Rationalisation)

The final workshop took place on 8 December 2015 from 5:30pm until 7:00pm at ‘Plant One’, Bowden, a short distance from the proposed community garden site (Figure 8.1 on page 173). As with the previous workshops in this case study, this workshop was designed by the researcher in consultation with the Community Engagement Manager at Renewal SA. The workshop was attended by one representative from the Adelaide City Council (the local government responsible for the site), three staff from Renewal SA, the town planner, ten members of the local community, and the researcher.

The workshop was divided into four sections: a recap of the previous workshops and explanation of the design so far, an exercise focusing on understanding what to include and exclude from stage-one of the garden, a discussion on how the garden might operate, and a final wrap up discussion of how the project would proceed. The outcomes from this workshop were presented back to participants in a report that is included in Appendix A.3.

After a short welcome and recap of previous workshops, participants were presented with an overview of the translation of the outputs from the co-design activity in the previous workshop into the design by the town planner. This presentation was made using a combination of printed materials and a digital presentation.

The exercise to engage citizens in the decision making process around what would and would not be included in the garden was a custom designed activity that facilitated a low-fidelity version of a participatory budgeting exercise (Figure 8.2 below). In this activity each participant was given a sheet of ‘idea pieces’ to cut out and a ‘budget’ on which to place each idea. The size of each piece was scaled to represent its estimated cost, and the budget baseboard was scaled to the total size of the budget. Each participant was then asked to assemble their preferred ideas onto the budget to show both what they would choose to include if they were the decision maker, and what they would choose to exclude.

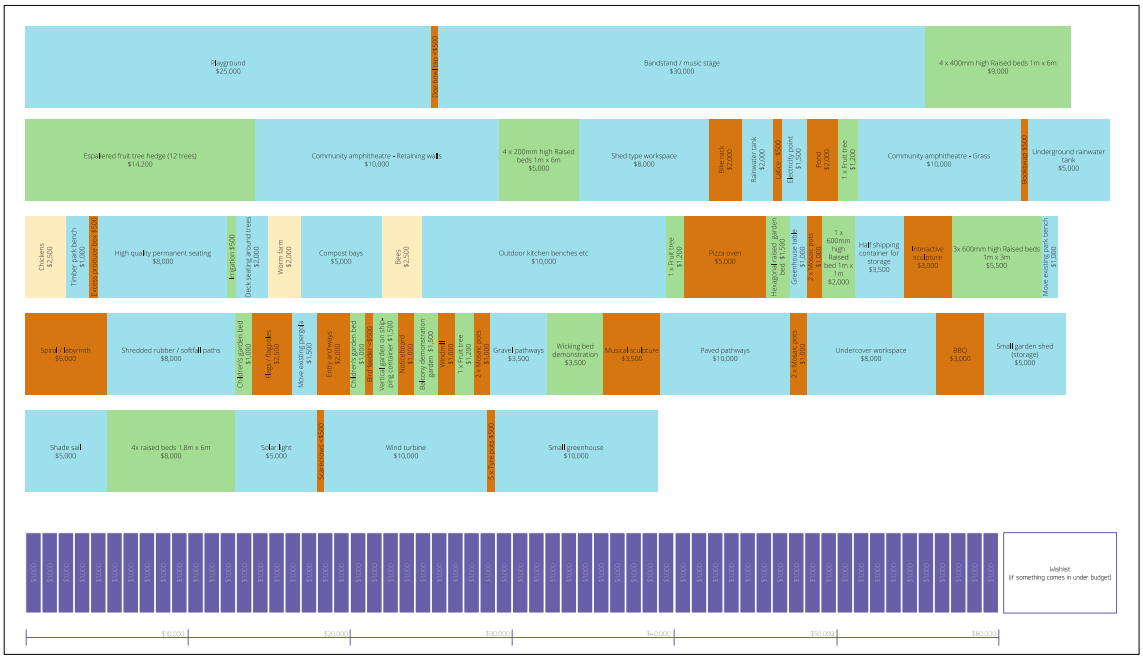


Figure 8.2: Participatory budgeting exercise worksheet

To create this exercise, each of the ideas that had been generated during workshops one and two were compiled into a list under broad thematic headings of “infrastructure”, “green elements”, “non-green elements”, and “other”. This list was sent to a representative at Renewal SA for a rough cost estimation, accurate to the nearest AUD $500 (EUR €300). Once the cost estimates were received the ideas were colour coded and scaled.

This final workshop had a number of new participants and a number of participants that had signalled disappointment at not being able to attend. This meant the discussion about how the garden might operate, including the organisational structure was conducted at a high level, focusing on participants co-creating the role descriptions of various important actors and beginning discussions on membership types and benefits. This was led by the sustainability manager from Renewal SA and the town planner, who were both active members of another community garden.

The final wrap up outlined how the project would proceed, in particular how the information gathered through the three workshops would be translated into a final

design for construction and how expressions of interest would be gathered for more official roles going forward.

Discussion: Workshop Three (Rationalisation)

This final workshop was interesting because it was designed to both provide feedback to those who had previously participated, and to engage any new community members in the process. After the experience of the previous workshop, a meeting was held with the town planner to run through how he was planning on linking the design he was presenting with the outcomes of the previous workshops, in particular the co-design activity in workshop two. His response was that he was happy to explain this in more detail but that it was unusual for him to be asked to design something a number of times and that he didn't really know what he was supposed to be designing. This is perhaps symptomatic of his individual experience as a designer rather than of the profession more generally because iteration in response to client or community feedback is a core part of most designers' practice. Despite the meeting that took place, as with the previous workshop, it was difficult to link the town planner's presentation with the ambitions of the community, particularly those expressed in the co-design activity of workshop two.

The participatory budgeting exercise was envisioned as a way of helping the community to take ownership of the decision of what would and would not be included in the garden. What emerged very quickly was the expression of disbelief by participants about how much certain items would cost to construct. This was very interesting because it highlighted a disconnect between professional and community expectations and knowledge. The discussion that followed was a very interesting example of social learning, with participants coming to understand not only the costs involved in the various elements, but also why the costs were so high. This then resulted in participants extrapolating beyond the immediate context and engaging in a very interesting discussion about the costs involved in infrastructure development more generally and coming to a realisation that many of the elements would be better funded and constructed by the community.

A particular example was the addition of a 'dog bowl tap' (a water faucet with a bowl at its base). The community members could not believe that a small bowl could cost anywhere between AUD $500 (EUR €300) and AUD $2 000 (EUR €1 200). Representatives from Adelaide City Council explained how the

cost had very little to do with the bowl itself, and was instead in the cost of establishing a worksite with fencing and portable toilet access, covering a plumber's callout fee etc. From this explanation, the cost began to make sense and community members then decided that it would be better to bring their own bowl or ice-cream container or similar to leave near to the tap for dogs to drink. The interactive nature of the activity provided the opportunity for this conversation to take place, providing the citizen participants with a new perspective, and the professional participants with the opportunity to convey their knowledge in a non-threatening way.

The 'dog bowl tap' and other examples refocused the conversation on what the community needed help to construct, rather than what they wanted to be given. This meant that this activity yielded a prioritisation of works based on what 'the government' should fund and build, and what 'the community' should fund and build. This was an unexpected positive outcome because it was anticipated that participants would simply divide the elements into categories of 'important' and 'not important'. This is a clear example of the way in which workshop environments can help to facilitate significant social learning about complex concepts.

Because the discussion associated with the participatory budgeting was yielding rich results, it was allowed to continue a little longer, meaning the discussion on roles and responsibilities was largely limited to a surface level exploration of the roles that might exist in the future organisation. Because a number of key participants from the first two workshops were not able to attend this final workshop this openness was not problematic and instead provided a non-committal way for participants to discuss the ways in which they might like to be involved.

8.3 Discussion

The Parklands Community Garden case illustrates a number of key concepts from the academic literature and highlights a potential gap for further exploration. Broadly, the case can be seen as a positive contribution to the development of a more resilient community that may be better able to respond to challenges associated with shifts in climate. The design of the case situates it between a bottom-up or citizen-led paradigm and a top-down or government-imposed

paradigm. The role taken by the government and indeed by the researcher was to help support the development of a resilient community through the co-creation process.

From a Multi-Level Perspective standpoint this case can be described as functioning at the niche scale with some learnings at the regime scale (Geels 2002). The direct impact on participants is assumed to be relatively small, although there were some exceptions to this that will be discussed below. In terms of the regime scale, the process facilitated an opportunity for Renewal SA staff to explore how co-creation and the urban living laboratory approach might be used in future developments.

The relationship with the Adelaide Living Laboratory is interesting because the Parklands Community Garden was treated primarily as an opportunity for social innovation and was therefore not linked with any research beyond this project. This was perhaps a failing of the design of the workshops but is also reflective of the user-as-subject conception of the Laboratory as described in Case A. Although this case enabled an exploration of various co-creation techniques, there may have been opportunities to blend this research with some of the engineering-based research taking place in other parts of the living laboratory.

The user engagement protocol was largely determined by Renewal SA in order to satisfy their internal organisational processes. Being an agency within the Government of South Australia meant that participation was defined through the IAP2 Spectrum (International Association for Public Participation 2014). In this case, participation was planned to be at the ‘collaborate’ level and the facilitation tools and processes were selected accordingly. It was decided by Renewal SA that this was a good level because it facilitated enough participation to allow citizens to be empowered as a part of the process, but retained decision making powers with a view to expediting the approval process.

Had Renewal SA selected the ‘involve’ level of the IAP2 Spectrum (International Association for Public Participation 2014), public participation could have been managed through surveys or other reactive rather than generative forms of consultation, removing the need for the co-creation workshops. Moving up to the ‘empower’ end of the spectrum, it was the view of Renewal SA that had citizens been given final decision-making powers, they may have put forward a proposal to

the Adelaide Parklands Authority (within the Adelaide City Council) that was not acceptable. This would have resulted in a significant delay to the approval and therefore the establishment of the garden, potentially disrupting their goal of starting to build community resilience through the garden organisation. Although this highly pragmatic approach can be seen as making sense, it does not sit well with the concept of critical pragmatism because it assumes that the professionally-held knowledge about the approvals process is the only correct solution.

The case provided a number of opportunities for social learning, both where participants learned from each other and from the professional participants. Some of these, such as the discussion on sustainability during the second workshop were planned, while others emerged organically, such as the discussion on why government infrastructure development costs more than private or backyard construction. Each of these experiences can be classified as individual-centric (Rodela 2011) and focused on cognitive enhancement (Webler, Kastenholz & Renn 1995).

The importance of establishing a dialogic rather than dialectic space in the facilitation of social learning was highlighted in the participatory budgeting exercise in workshop three. By giving each participant their own budget to create, the exercise stimulated conversation about the content and allowed each perspective to be voiced. Had participants been working together on a shared budget, or focused on making a shared decision, it is likely that this would have created a more dialectic exchange based on power, dominance and/or negotiation, and therefore not created a space in which social learning could take place (Sennett 2012; Webler, Kastenholz & Renn 1995).

During this case some of the disconnection between the town planner and the community became apparent through both misunderstandings and miscommunications. The role played by this planner was very much in line with Frediani's (2016) description of a traditional designer-as-expert role description and did not engage as might be expected of a designer in a co-creation process. This may reflect the designer not understanding how to work with communities, or, given the designer's previous experience, it is assumed this occurred because the designer did not understand their role in a co-creation process that was being facilitated by a third party.

From the researcher's perspective, it appeared as though the town planner did not understand the value that was being generated through the co-creation process. The decision to ignore community input in favour of a design they believed would 'work better' appears to show a belief that the co-creation process was established as a process of information gathering. This assumption would appear to be in line with the IAP2's description of the 'collaborate' process (International Association for Public Participation 2014). However, this does not acknowledge the role of co-creation in community building, social learning, or other forms of value generation.

The case study also illustrates Yukl (1989) and Northouse's (2007) description of how the formal assignation of a title or role precipitates positional power. In this case, community participants were unwilling to question the ideas or authority of those that were attending in a professional capacity, despite some participants holding significant experience and expertise themselves. This was perhaps illustrated in the first workshop with the establishment of a series of non-negotiable safety and development rules for gardens in the Parklands by the Adelaide City Council, and in latter workshops through the perceived superiority of the ideas that came from the town planner. In the first example, cues of authority including wearing a uniform, using logos on slides, and delivering a one-way sit-and-listen PowerPoint presentation, were used to insist that a number of factors were non-negotiable.[50] This can be read as being incompatible with critical pragmatism because of the unwillingness of those in power to question their own position on issues (Forester 2013). However, it should also be noted that the positive engagement and openness to ideas that followed this initial presentation was more in line with a critically pragmatic approach.

8.4 Conclusion

This case has described some of the benefits of engaging with communities through the co-creation methodology including the demonstration of how co-creation process can generate novel ideas, build new communities among participants, and facilitate individual social learning processes (Rodela 2011).

[50] This was particularly interesting because much of the information that was being presented as 'non negotiable' had in fact been negotiated with a previous residents group in the establishment of another community garden in the Adelaide parklands.

However, it also demonstrates some of the issues that emerge when attempting to facilitate a co-creation process in the built environment. In particular, the case demonstrates the way in which positional power impacts the process and highlights the importance of professional designers understanding their role in co-creation processes.

As described in section 8.3, positional power was used to establish the scope and boundaries of the idea generation stage, but, once these boundaries had been established, the power dynamics became more balanced. This shifting approach will be seen again in Case C with power used to set boundaries rather than control ideation.

The difficulty in understanding the value of the co-creation process on the part of the town planner emerged as a particularly interesting concept to explore further in Case C (Chapters 9 and 10). In particular, the second part of Case C (Chapter 10) will explore the hypothesis that the co-creation process can generate complex layers of value, and that these are not well understood by professional designers.

Chapter 9 Case C: U City – Part 1

The following two chapters present the primary case study of this research, U City. The presentation and evaluation of the case is split broadly into the discussion and evaluation of processes in this chapter, and the discussion and evaluation of outcomes in the next chapter (Chapter 10). This approach is based on the importance of attending to both process and outcomes (highlighted in section 5.5) and allows the case to be discussed in greater depth.

This chapter begins with an introduction to the case and the researcher's role in the project before describing the project site and user-recruitment strategy in more detail. It then presents four workshops, three of which were facilitated by the researcher, and the fourth by the architecture firm that was engaged in the project with the researcher as an observer. Although the context is somewhat different, these workshops are presented in a similar format to those in Case B to allow easier comparison.

This chapter then expands the discussion to introduce some of the other consultation processes that took place as a part of the development but were outside of the first-person experience of the researcher.

The discussion in this chapter is limited primarily to the co-creation processes that took place, with further analysis of the outcomes from these processes presented in the next chapter (Chapter 10).

Although the approach taken in this case was developed in response to the experiences of cases A and B, this chapter and Chapter 10 do not explore links between the three cases, nor explicitly link the case with the meta-narratives of the thesis: social learning, behaviour change, and sustainability. These discussions will instead take place in a cross-case discussion in Chapter 11.

9.1 Project Introduction

This case sits outside of the boundaries of the Adelaide Living Laboratory project. The reasons for this were briefly outlined in Chapter 7 and centre around the need to identify a project that was at the right stage in the construction process to facilitate this research.

U City is a sixteen-storey mixed-use building in Adelaide, South Australia that was developed by and for community services organisation Uniting Communities. The construction project formally commenced in 2015 and is anticipated to be completed in late-2019. Conversations between the researcher and Uniting Communities began in late-2015, and a series of workshops were undertaken in 2015 and 2016 during the design development and documentation process. Interviews with participants were then conducted in 2017.

Uniting Communities has historically operated from a number of non-purpose-built facilities across the Adelaide CBD and inner suburbs. The construction project was therefore envisioned as an opportunity to consolidate their geographical footprint, and at the same time create a new model for a vertical community.

Uniting Communities provides a wide range of services, that are broadly separated into services for:

- Older people
- Families & children
- Youth services
- Aboriginal services
- Disability services
- Mental health & counselling
- Financial & legal services
- Homelessness, emergency & community support (Uniting Comunities 2019a).

This represents a tremendous variety in terms of the kinds of support programs and begins to illustrate the complex range of programs that are to be housed within the U City project. As well as the organisation's own office and service delivery infrastructure, the U City building will have commercial office space, retirement apartments, supported independent living units, disability respite housing, and a function centre (Uniting Comunities 2019b).

Uniting Communities partnered with the researcher as a way of facilitating additional end-user engagement in the design of U City alongside the industry standard consultation and engagement processes that were facilitated by the various professional consultants involved in the project. The research was therefore conceived as providing additional engagement opportunities rather replacing the industry led engagement processes. This gave the researcher the opportunity to apply techniques and principles of co-creation from the living laboratory and co-creation literature as well as to capture the impacts of standard industry practices.

At the time of the researcher's engagement, the project was being led by a project management firm that had been appointed to develop a project brief that could be used as the basis for engaging an architecture firm as a consultant in 2016.

The site for the project was the corner of Pitt Street and Franklin Street in Adelaide's CBD (Figure 9.1 below). This site was owned by the organisation for a number of years and previously housed a church building.

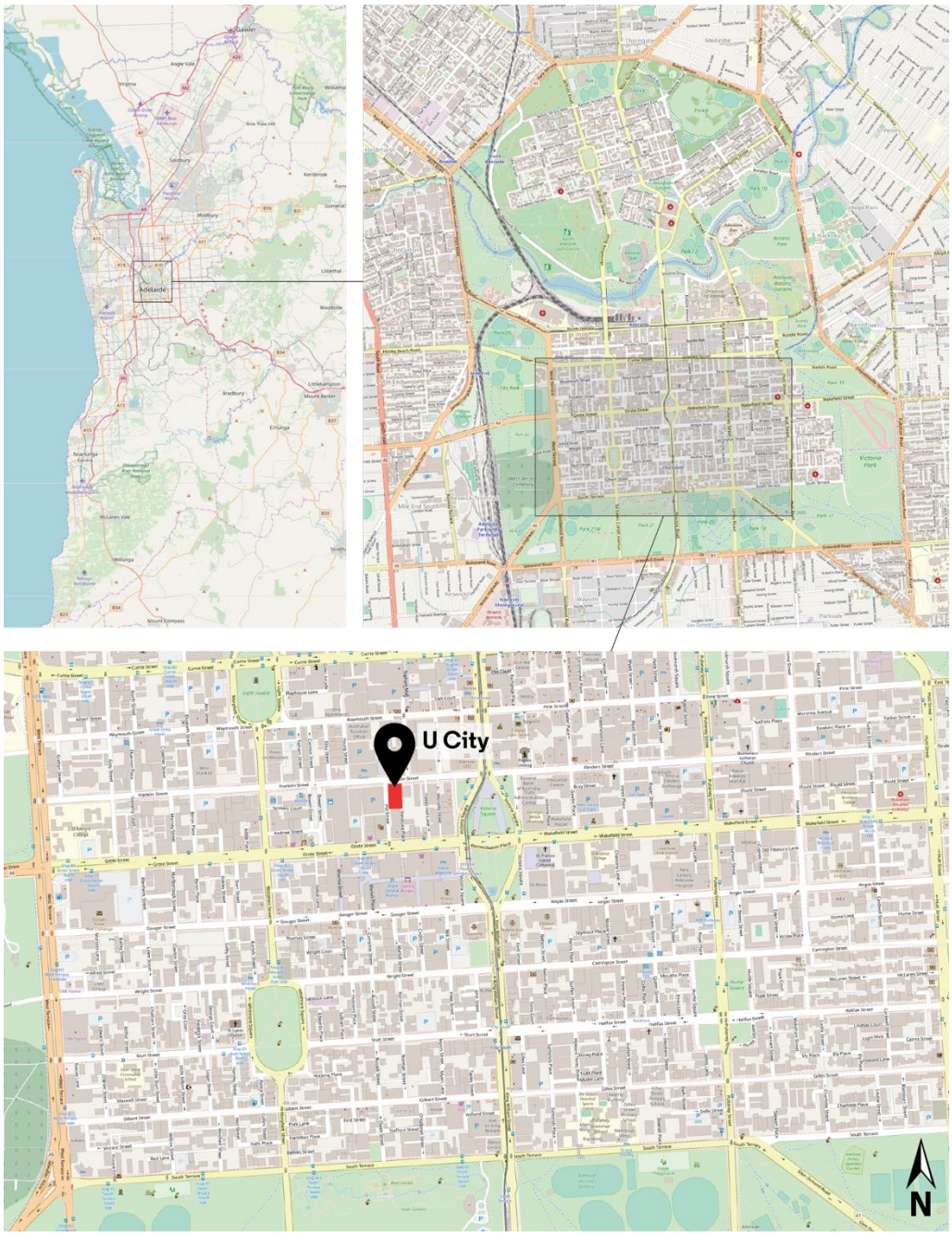


Figure 9.1: The U City project location

9.2 Workshop planning and recruitment

As the previous section suggested, the U City project has a very complex array of 'end-users'. This is in contrast to many product-based or service-based living laboratory projects from which the living laboratory and co-creation methods are drawn where end-users can be more easily defined (Sauer 2013). In considering the future users of the U City building project, this research focused on two major groups: the staff of the Uniting Communities organisation that are providing services to the community, and the clients of these services. Both of these groups are significant future end-users of the new building project.

Many of the client populations that Uniting Communities provide services for can be classified as being vulnerable. Because of this, it was decided in partnership with the organisation and with guidance from a representative of the Human Research Ethics Committee that these vulnerable groups would be represented in the co-creation process by proxy rather than first-hand participation. This decision was strongly supported by the leadership of Uniting Communities as they believed it satisfied their duty of care to their client groups.

Proxy representation is in opposition to the ideal models of user participation in co-creation processes that are discussed in much of the co-creation and living laboratory literature (Haukipuro, Heikkinen & Kivimäki 2013; Logghe, Oelbrandt & Schuurman 2014; Sauer 2013; Von Hippel 1986). However, there are two strong justifications for continuing with the case study with only the staff of the organisation as users. Firstly, the emergent theory that in the right circumstances proxy representation can have a similar level of accuracy as first-hand participation, and secondly, that the focus of the research is on the value for professional consultants of applying living laboratory and co-creation methodologies to projects in the built environment.

As introduced in section 5.3, Sanoff (1994) and Sanders (2000) argue that those that work closely with a particular population or group may be able to give insights that mirror those that would be given by the actual population. This means that given the opportunity it could be reasonably expected that service delivery staff would be able to represent the views of their client groups with an acceptable level of accuracy. While this is not tested in this case, a number of instances will emerge where the information given by staff is different when being asked to represent their clients rather than themselves. In acknowledgement of the dual role

the staff end-users were envisioned to play, a core part of the design of the engagement activities as a part of the co-creation workshops is to facilitate the distinction between the staff end-users representing themselves and their teams and representing their clients.

Perhaps a more convincing argument to justify the exclusion of these end-user groups from the co-creation process, however, is that the case is being used to explore the emergent theory that professional participants do not in some circumstances recognise the full value of end-user participation in co-creation processes. In order to investigate this phenomenon, the differentiation between types of end-users is of less importance than the ability to engage with end-users.

The recruitment of participants was managed through a process of invited representation that was controlled by the executive project manager within Uniting Communities. This method was used at the request of the Chief Executive Officer (CEO) of Uniting Communities and was considered an appropriate way of engaging with a broad range of the organisation's staff. The initial discussions established that the executive project manager would seek to invite participants from all levels of the organisation, from executive management down to service delivery and entry level administration support staff. An absolute breakdown of the participants cannot be reported on as it would identify a number of participants. However, the majority of participants that accepted the invitations to participate were from a 'service manager' level which equates to a 'middle management' role.

9.3 Co-creation workshops

Three co-creation workshops, described in sections 9.3.1, 9.3.2 and 9.3.3 below, were facilitated by the researcher between December 2015 and April 2016. One further co-creation workshop, described in section 9.3.4, was facilitated by a team from the architecture firm associated with the project in August 2016 with the researcher present as an observer.

9.3.1 Workshop One

The first workshop took place on 7 December 2015 and was attended by 20 participants from Uniting Communities, two representatives from the professional project management firm that had been engaged for the project, the researcher, and one of the researcher's supervisors as a co-facilitator. The workshop was hosted at

an existing Uniting Communities facility. This meant the end-user participants (staff) were attending as a part of their normal working day.

Participants were asked to complete a photo-journal exercise (Prosser & Schwartz 1998) prior to attending the workshop, and then three activities during the workshop: ‘what works, what doesn’t?’, ‘coming being and going’, and an ‘aspirations exercise’.

Results

The photo-journal exercise asked participants to take photographs of their current workspaces, including their immediate desk-environment, spaces where they interact with their co-workers, spaces they use to work with their clients, and any other spaces their clients experience. These were sent to the researcher ahead of time and collated into a series of worksheets for this first exercise. The photo-journal exercise resulted in the submission of 24 images that focused on a range of spaces. Some were sent to the researcher with a pre-defined notion of ‘good’ or ‘bad’ that was removed as part of creating the picture cards for the first exercise.

Following a short introduction, participants were split into four groups and asked to draw on the printouts of the photographs. Teams were asked to highlight those things that work well, and those that could be improved. Teams then presented back to the group as a whole to facilitate a broader discussion about what was most important in their spaces. The data from this whole-group conversation was recorded live by the co-facilitator, and the papers used during the individual group discussions were also collected at the end of the activity. This data was then analysed using an inductive thematic analysis process (Boyatzis 1998).

Although the data distinguishes between positive and negative responses, the analysis focused on overall frequency of discussion about the themes. This then enabled the workshop analysis to identify the areas that future co-creation workshops might focus on. A summary of this analysis is provided in

Table **9.1** below while a more complete data set can be found in the workshop report in Appendix B.1. The column labelled ‘group discussion’ relates to the themes present in the presentation back to the group, while the column labelled ‘materials analysis’ captures all data that was written onto the picture cards. This presents the data that participants nominated as being most important as well as the more holistic data set.

Table 9.1: Frequency analysis of top themes identified in the 'what works, what doesn't?' photo journal exercise group discussion and written materials analysis

Theme	Group discussion total (+/-)	Materials analysis total (+/-)
Technology	7 (4/3)	21 (8/13)
Personal workspaces	7 (2/5)	19 (5/14)
Privacy and partitioning	6 (2/4)	15 (10/5)
Lighting conditions	5 (2/3)	19 (8/11)
Storage	5 (1/4)	14 (7/7)
Communal spaces	3 (1/2)	11 (4/7)
Brand identity	3 (2/1)	11 (4/7)
Meeting spaces	2 (1/1)	9 (5/4)
Plants and greenery	2 (2/0)	6 (4/2)
Waste disposal and separation	2 (2/0)	3 (2/1)
Indoor climate	1 (0/1)	6 (1/5)
Colour and decoration	-	6 (2/4)
Windows and views	-	4 (2/2)
Parking and access	-	1 (1/0)

The second exercise, 'coming being and going', focused on discussing how the participants and their clients access the existing Uniting Communities facility at Pitt Street. The majority of participants worked at the current Pitt Street facility on a daily basis, however, three participants were based at another site and visited the Pitt Street site only when required.

Participants were given a worksheet (Figure 9.2 below) and asked to use different coloured pens to mark three different journeys through the building: professional, personal and client. The professional journey describes where they move through the building carrying out their professional duties. The personal journey covers activities such as when they were taking breaks or having social conversations within the building. Finally, the client journey describes how clients of their service were likely to move through the building.

Participants were also asked to circle one or more transport modes that were likely to be used for each purpose. The options given were train, tram, bus, taxi, Uniting Communities pool-car, private car, electric or hybrid car, bicycle or walking.

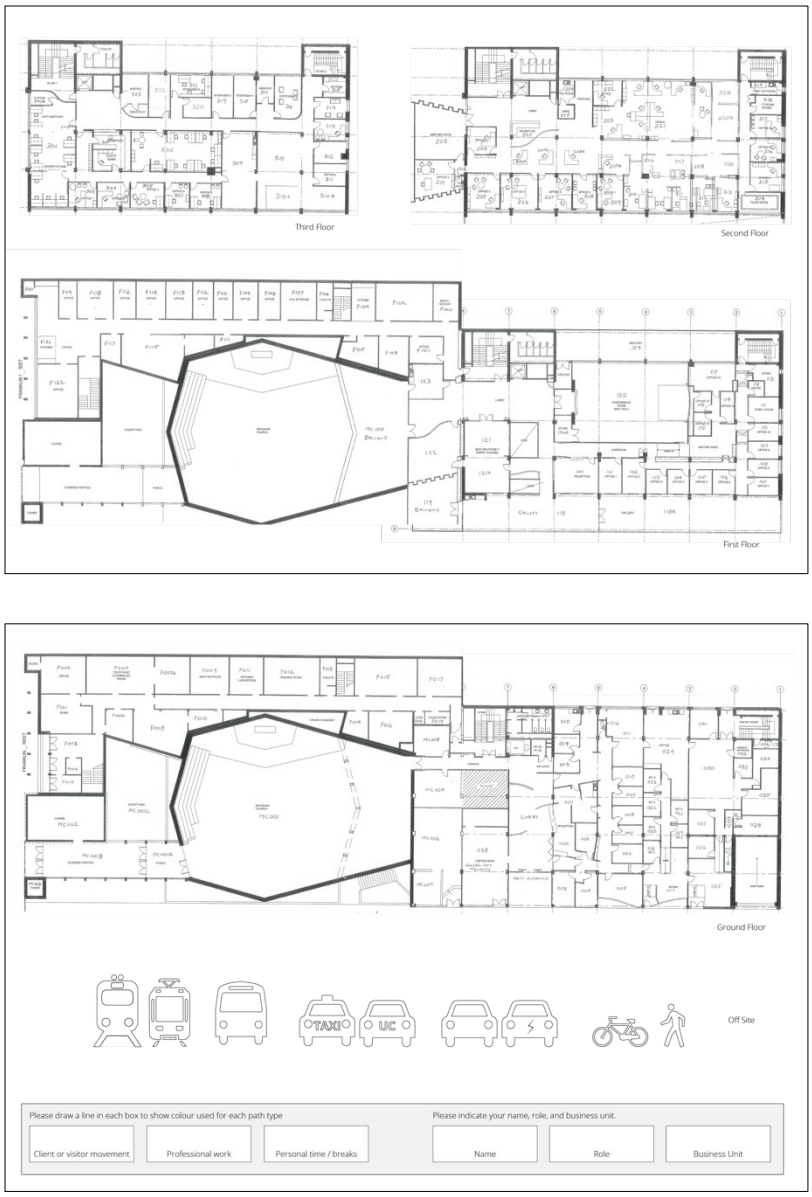


Figure 9.2: 'Coming, being and going' worksheet given to participants

The 20 completed worksheets were then overlaid to produce a series of analogue 'heat-map' diagrams. A sample of these diagrams is provided in Figure 9.3 below, with a more complete set available in the workshop report in Appendix B.1.



Figure 9.3: Combined 'heat-map' of programs on the second floor of the existing Pitt Street facility showing professional, personal and client or visitor movement through spaces.

These diagrams begin to highlight tensions and overlap between 'client spaces' and 'staff spaces'. This is particularly illustrated by some of the conflicts where clients occupy spaces frequented by staff during 'personal time' such as meal breaks. A number of instances, particularly on the ground floor and third floor also emerge where clients are required to navigate complex journeys. This was noted by the staff as being problematic for clients feeling comfortable when visiting their services.

The final activity in this workshop used a card-sorting activity to facilitate discussion between participants about the kinds of spaces they would like to see in their new headquarters. This activity used 100 images selected by the researcher of interior spaces. The images specifically showed conditions such as light, privacy, clutter, etc. but also included a number of more abstract images. Participants were split into four groups with approximately five people in each and asked to make notes on the back of the cards about things they liked or didn't like in the image. As a team, they then selected five cards they liked, and five cards they disliked for presentation back to the larger group.

The majority of participants focused on spatial layout and furniture selections, as well as the selected buildings' general atmosphere and feel. There were a number of comments about green space and plants, as well as movement and way-finding, and the integration of technology. The analysis was similar to that of activity one and is summarised in Table 9.2 below.

Table 9.2: Frequency analysis of themes discussed in the 'aspirations exercise' group presentations and written materials analysis

Theme	Group presentations total (+/-)	Materials analysis total (+/-)
Building atmosphere and 'feel'	36 (21/15)	169 (95/74)
Layout and furniture	32 (18/14)	162 (88/74)
Greenery and connection with outdoors	11 (11/0)	40 (39/1)
Technology	3 (2/1)	22 (12/10)
Movement and wayfinding	5 (2/3)	15 (7/8)

Discussion

The three activities of this workshop were designed to generate information that could be used to inform a design brief or used by the project's architects to inform their decision-making processes and highlight the areas in which the end-users felt they had a significant contribution to make. The photo journal activity was seen by the project management firm as a useful addition to the space audit they had undertaken because it added further depth to the information they had previously collected.

Although they saw value in the output from the first activity, the attitude of the staff from the project management firm's staff was generally problematic during this workshop. They primarily used the workshop session to try and downplay expectations about how much influence the end-user group was likely to have over decisions made in the project. This approach is symptomatic of an understanding of co-creation or consultation that is aligned with the IAP2 spectrum (International Association for Public Participation 2014) discussed in section 5.7. That is, it appeared they believed that the level of involvement of end-users in a project was directly correlated with the amount of influence over decisions that they would seek to have. Further to this, their attitude is reflective of a dialectic rather than dialogic model of co-creation (as described in Chapter 4). Further detail on the effect of the interactions that took place between this consultant and the end-user participants will be discussed in the Value Network Analysis process (section 10.3).

The materials used in the 'coming, being, and going' exercise provided the researcher with a first-hand understanding of the difficulty some people have in understanding architectural drawings. It was assumed that the staff would be familiar with the floorplan of their own existing building and therefore to use spatial reasoning to link the upper two floors which were not aligned in the worksheet. Some notes were made on this by the researcher at the time and notes were made to try and avoid using floor plans wherever possible in future workshops. As will be seen in the next two sections, however, floor plans continued to be used as there were not any suitable alternatives found.

9.3.2 Workshop Two

The second workshop took place on 9 March 2016 and was attended by approximately 20 staff from Uniting Communities, one staff member from the project management firm, a representative from the recently appointed architecture firm, and the researcher. The participants were different from those that had been engaged in the first workshop with the exception of the researcher and the staff member from the project management firm. Participants were provided with a copy of the report from the first workshop in advance of the second workshop that they were asked to read as preparation. The workshop was two-hours in duration and was structured around three activities: a personas exercise, an idea brainstorming session, and an iteration exercise.

Results

The persona exercise was intended to create a series of fictional personas that could be used by the architects to test their ideas against a range of characteristics. The exercise was based on the Identity, Power, and Politics framework developed by IDEO (2011, p.159), and asked participants to reflect on who their clients were and what needs they may have. The exercise then looked to identify instances where client needs were oppositional or competing. It was intended that Quinn's competing values framework (Quinn 1988) would be used for this but there was not enough time allowed in the workshop to apply this model. Table 9.3 below provides a snapshot of the results from this exercise.

Table 9.3: Persona data collected as part of workshop 2, activity 1

Provocation	Responses		
Age:	'All ages' 0–5 10–18	12–25 18–25 18–90+	30–60 40–50
Gender and cultural background:	Aboriginal people Torres Straight islander Anglo	Male Female LGBTI	Migrants with poor English Culturally & linguistically diverse
Economic background:	No income Low income Financially stable Receiving a pension	Low socio-economic status Middle income Employed Unemployed	Redundant People used to high incomes Middle income with financial stress
Presenting with:	Alcohol and drug issues Underlying trauma Effects of child abuse	Women in trauma Underlying mental health issues	Domestic violence People struggling with mental health
Seeking:	Financial advice Counselling services Health services Long term planning	Walk-in service Food Information Immediate help	Clean needles Support with drug and alcohol issues
Value:	Confidentiality Privacy Safety Quick response Discretion	On-schedule Structure Good presentation Clear labels Respect	Outcomes Response Speed of access Anonymity Ease of access
People attending:	Young people Elderly Separated Disengaged from family Corrections clients Homeless clients Parents of young people Children Youth Single parents Families of clients Children with autism Intoxicated persons	Pregnant clients People with disabilities People with mobility issues People in wheelchairs Prams People who are deaf People with poor literacy Struggle to access the city Live in northern suburbs First time visitors 'Inexperienced' clients People who are blind Low education levels	Other support workers e.g. interpreters Kids with poor school attendance Kids with developmental delays Parents with children (where children aren't clients) Multiple children under 15 years People with other physical impairments People from a single parent household
Behaviours displayed:	Articulate Vulnerable Loud and showing off Confrontational Tired Stressed Unhappy Socially anxious Nervous Unsure Embarrassed Scared	Feeling threatened Feeling weird Not thinking clearly Intimidated Intimidated by wealth / prosperity Angry Shame Entitlement Anxious Unrealistic expectations Racist	Loud No crowds Not trusting Abusive Hyper-vigilant Volatile In a state of chaos Low expectations Expecting just to be treated as a number Judgemental of unusual behaviours

The second and third activities were designed in response to participant feedback from the first workshop where they suggested that they did not have enough opportunity to put forward specific ideas. Participants were given post-it notes and asked to record some of the ideas they had for addressing some of the needs they had identified in the first exercise. They were then asked to take one or two ideas and to iterate possible solutions. It was explained that this could be through drawings, design ideas, a network diagram, or text-based description. The professional participants brought along design drawings and were encouraged to work with the various end-user participants to help make their ideas visual. This did not happen to any great extent. The plans they brought along did however stimulate a number of very interesting conversations that will be discussed in the next section. A summary of the outputs from these activities can be found in the workshop two report in Appendix B.2.

Discussion

The activities in this workshop were intended to give the professional consultants, particularly the newly appointed architects, a more nuanced level of understanding of the needs of the Uniting Communities staff and clients as future users of the building. The first activity used personas as a way of engaging with the end-user client group within the limitations of the ethics approval for the project. As discussed in sections 5.3.3 and 9.2, the information provided is assumed to be relatively accurate because of the close working relationship between the service delivery staff and their clients. The second and third activities then took these personas and applied them as a generative tool for ideas to deal with any identified conflicts between user needs.

At the time of this workshop, the architecture firm were working through their plans for the ground floor, first floor, and second floor which would become the main entry point, service delivery suite, and a conference venue that could be rented to external groups. A reflective journal entry about this workshop documented a number of powerful conversations that took place between the end-user representatives and the professional consultants, particularly the architect that was present. Among these was a conversation about a hypothetical situation where clients from a range of services were imagined to be arriving at the building at the same time. This included a wealthy individual discretely entering the building to attend counselling for a gambling addiction, a person arriving through the front

door with all of their belongings in shopping bags because they had lost their housing, a person with a physical disability who had lost control of their bowels, a client under the influence of meth-amphetamine who was lashing out angrily at passers-by, people attending a meeting at the commercial conference venue, and residents of the luxury apartments on the upper levels of the building. The conversation grew from including a small number of participants, to becoming a whole-group discussion that came to the conclusion that what was shown in the designs at that time was not going to work. There was a general agreement reached that although it was a fantastic idea for all of the building's users to be treated equally and to access the building in the same way, this would not work in practice. A number of suggestions were made, including the provision of a space on the ground floor where challenging individuals could be discretely managed, as well as the provision of a separate entrance for crisis management services.

In the days that followed the workshop the architecture firm reworked their plans for the ground floor space. They incorporated a number of the elements that had been raised by end-users during the workshop session and moved away from the building having a single point of entry for all users. Approximately two weeks later, the architects returned to meet with the internal project management team of Uniting Communities to discuss progress on the design of the floors in question. At this meeting, the architects presented a number of options for ways the building could be redesigned to incorporate the information they had gathered during the workshop. The researcher was not present at this meeting, but the internal project management team were reported to be upset by these changes. The architects were subsequently instructed to undo the changes and revert to the designs that reflected the vision of the CEO.

From this point onwards in the research, an additional approval process was established to ensure the internal project management team retained control over the information that was being used to inform the design process. Any information from end-users that the architects would consider when making changes to the design of the building were subsequently passed through the internal project management team prior to the architects making any design changes. Further

analysis of this experience and its relationship with power[51] will take place in the discussion section of 9.3.3.

9.3.3 Workshop Three

The third workshop took place on 14 April 2016 and was attended by 12 participants from Uniting Communities, the researcher, two representatives from the project management firm, and one from the architecture firm. For the majority of Uniting Communities staff participants at this workshop (*n*=11), this was their first opportunity to be involved in a co-creation workshop associated with the construction project. It is unknown however, how many of the participants had been a part of other consultation activities that were outside of the co-creation workshop series. Prior to the workshop all participants were provided with the reports from the previous two workshops and asked to read them as preparation for their participation in workshop three. The workshop was divided into two sections: a series of presentations by the CEO of the organisation and the project architect, and an interactive feedback session.

Results

The workshop began with a presentation from CEO of Uniting Communities that outlined his vision for the project as well as why the changes in design resulting from the feedback in the second workshop had been rejected by him as CEO with the support of the internal project management team. The workshop then focused on the design of the ground floor and first floor, with discussions about these spaces through the lens of the staff group, and then the client groups they work with. These discussions were facilitated using floorplans provided by the architect prior to the workshop as well as the 'personas' information from the second workshop (Table 9.3 on page 202).

The CEO's presentation broadly explained the vision for the building as being divided into:

- Selling: Ground floor — connecting with the broader community through retail, hospitality and selling Uniting Communities' services
- Serving: First floor(s) — providing services to the broad range of clients Uniting Communities serves

[51] As discussed in section 5.4

- Working: Middle floors — a blend of Uniting Communities' office space and commercial office space to allow room for the future expansion of the organisation
- Living: Upper floors — a range of living modes including luxury retirement apartments, supported independent living units, and disability respite accommodation.

The presentation described his vision of a vertical community that would demonstrate the way in which people can live, work and enjoy life together despite significant socioeconomic and sociocultural differences. The CEO also described a 24-hour community that would increase the vibrancy of the local area and catalyse opportunities to connect with the communities they serve beyond the traditional 9:00am – 5:00pm paradigm.

After this presentation and a small number of questions, the architect introduced the topic of the first discussion as 'the staircase question'. As a part of this introduction, he presented a number of perspective sketches that he had prepared of this part of the building as well as some architectural renderings. This approach was agreed upon by the architect and the researcher after a discussion about the difficulties encountered in previous workshop sessions with the use of floor plans.

The architect described the difficulty his firm were having working through how large volumes of people would move from the ground floor entry space up to the first-floor service-delivery space and auditorium space without disrupting each other or other users of the building. For the architect, the importance of this circulation had been emphasised by the feedback in the second workshop. He therefore spent a significant amount of time in his presentation explaining why he saw this as a significant challenge and why it was critical for the overall success of the building.

Participants were then split into two groups, one that was led by the researcher, and the other by the architect. Here, copies of the images shown in the presentation were used to explain the floor plans that were being used to gather feedback. Interestingly, the ground floor plan was taken from Revit Architecture, while the first-floor plan was hand drawn. Each participant was given a copy of the floorplans so that they could make notes that were then collated by the researcher.

These groups then undertook two activities. The first activity was to consider the ways in which the spaces would suit their needs as end-users of the building, and the second, to interrogate how the proposed spaces might meet their clients' needs.

Figure 9.4 below presents a summary of the discussion points raised in the first activity while Figure 9.5 on the following page presents a summary of the discussion in the second activity. Further data from this workshop can be found in the workshop three report in Appendix B.3.

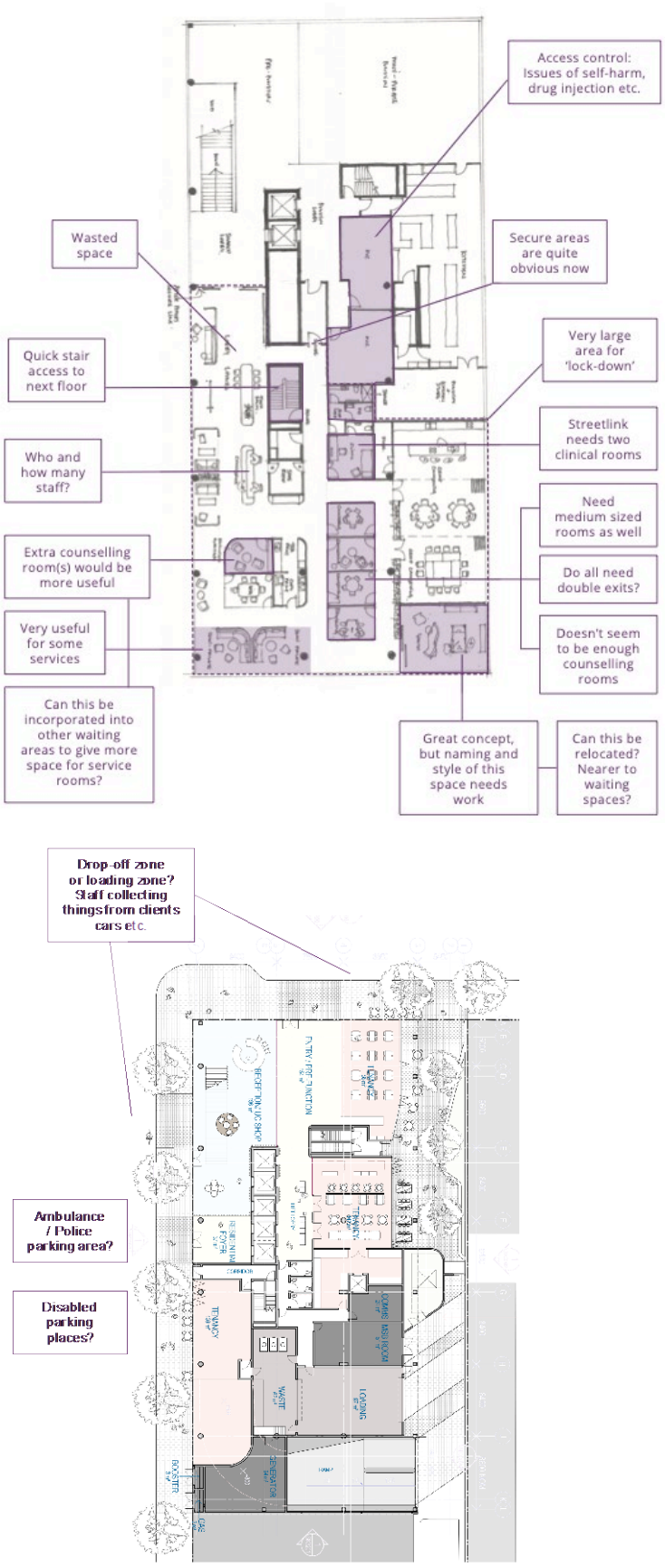


Figure 9.4: Feedback on ground floor (bottom) and first floor (top) plans based on participants' understanding of their needs as service delivery staff

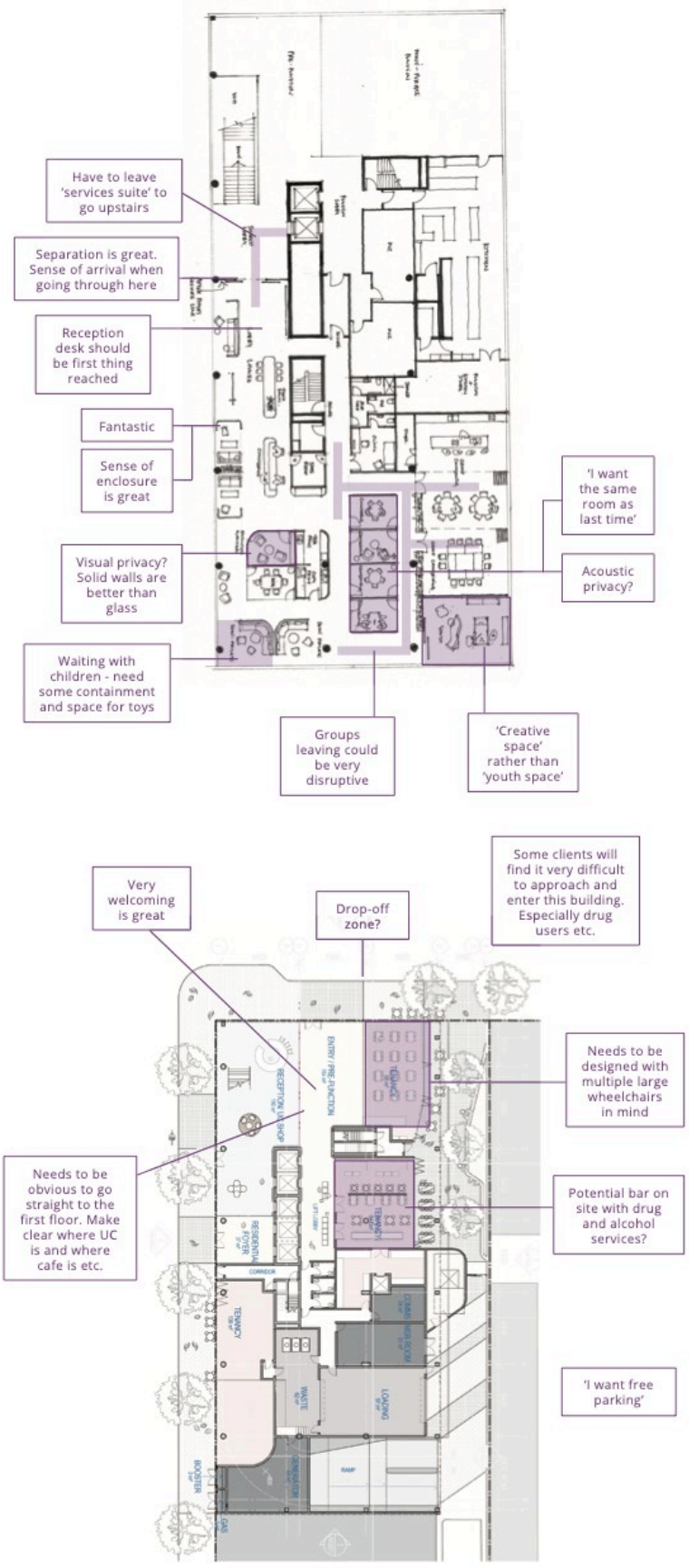


Figure 9.5: Feedback on ground floor (bottom) and first floor (top) plans based on participants' understanding of their clients' needs

During the second activity, one of the participants queried the suitability of the client waiting spaces, suggesting that it did not look like what was being proposed would meet the specific requirements of the family counselling service that he worked within. Initially this was seen as the service perhaps wanting its own waiting spaces, but through further discussion it was uncovered that there is a legal requirement to provide separated waiting areas for both parties in family conciliation counselling, and that this was probably not possible in the proposed spatial plan. This is not noted in Figure 9.5 because the feedback was oral rather than written.

Discussion

The presentation by the CEO about why the feedback from the previous workshop was not to be taken forward can be seen as demonstrating a high-level of understanding of consultation. Had this not taken place, and the reasoning behind the decision not been explained, the process would have resembled one of the non-participation levels on Arnstein's (1969) ladder. However, by being transparent with the user group, and implementing this additional layer of scrutiny on the information being used to make decisions, the collaborative process was allowed to continue without compromising the decision-making power of the executive and internal project management team. The success of this presentation again reiterated the need to think beyond decision making power in evaluating consultation processes.

The approach taken by the CEO appears to align with Forester's (2013) Critical Pragmatism. By reiterating the value of the organisation's staff being involved in the process, and carefully explaining why the viewpoint would not be taken forward based on all of the evidence he was presented with, he was able to demonstrate his respect for the input of the staff, while also showing the complexity of the decision he had to take.

The researcher's reflective journal entry at the time was critical of the decision to 'ignore' the end-user feedback, but, the way the organisation continued to engage and to collect significant amounts of information from its staff group suggests this was not an example of power being used as a manipulative tool, but instead to prioritise strategic leadership in important decisions.

The distinction between forms of leadership and expressions of power was highlighted as being very complex in section 5.4. However, with the challenges presented to democratic process by the higher levels of the IAP2 spectrum (Local Government Association of South Australia 2016) and concerns about devaluing professional skills (Schatz & Rogers 2016), this small example demonstrates the significance of conceiving of co-creation as a dialogic process, focusing on ideas and information rather than a distributed form of democratic decision making.

The two workshop activities provided a rich variety of feedback for the architects to consider. What is very interesting from a research perspective, however, is that there was minimal cross-over in the discussions and information that emerged in the two activities. This appears to support the assertion that those who work intensely with user groups are able to successfully act as proxies for their interests (Sannoff 1994; Sanders 2000), but also suggests that given the right prompts, these users may be able to represent both their own needs, and the needs of the groups that they work with.

As an example of this, the consideration of the appropriateness of a bar as a tenant within a building that is owned by an organisation that is providing drug and alcohol rehabilitation services was only raised when the end-users were asked to look at the drawings through the perspective of their clients. When discussing this as ‘staff end-users’, both groups thought it was a great way to break down barriers with the community, and to start to create a presence that extended beyond 9am–5pm.

Uncovering an element of the design that was not compliant with legislative requirements is interesting because it provides further anecdotal evidence of end-user engagement leading to significant cost savings. By reducing design errors at the stage when making changes is relatively inexpensive, end-user engagement may be seen as a significant asset to the process.

The ability of BIM approaches to detect errors in the coordination of services, or in fire evacuation design has been recognised in the construction industry for a number of years and is equated with significant cost savings (McGraw Hill Construction 2014). This research has not however found literature that specifically describes the way in which end-user review is able to detect more complex errors like the error described above. This idea will not be further

developed in this thesis, but for projects with complex programs that require architects to satisfy the requirements of a range of regulatory frameworks, this experience demonstrates that significant end-user engagement beyond the traditional 'client' can be useful in reviewing designs and identifying errors.

9.3.4 Workshop Four

The final workshop took place on 11 August 2016 and was attended by 18 participants from Uniting Communities, the researcher, and four staff with varying levels of experience from the architecture firm. In this workshop it was agreed that the researcher would be present as an observer to gain some insights into the processes the architecture firm were undertaking for parts of the project that the researcher was not involved with. Approximately half of the end-user participants in this workshop had participated in one of the previous co-creation workshops while for the other half this was their first opportunity to participate in the project.

This workshop was again focused on gathering feedback about the design of the ground floor and first floor spaces, but this time with a focus on the uses of the multi-purpose auditorium space on the first floor. The data from this workshop session was collected using voice recording of the session, as well as a small number of photographs, the researcher's reflective journal, and some descriptions from the semi-structured interviews that will be discussed in more detail in Chapter 10. Because of the researcher's role as an observer, the results from this workshop will be presented in a more discursive way than the previous three workshops and will focus on observations of the process rather than the data that was generated. Unfortunately, the researcher was not able to access the notes taken by the facilitators of the session when writing up this case.

Results

The workshop began with a short presentation from the CEO of the organisation to set the tone and establish boundaries for the discussion. This followed the format that was considered to have been successful in Workshop 3. The presentation included marketing materials that had been recently created to showcase the development to potential investors as well as the CEO's vision for the project. The presentation then shifted to the project architect (lead architect) providing an update on the design discussions that the firm had been having internally and describing the kinds of feedback they were seeking from the session. In this

presentation, a number of questions were posed about the multi-purpose auditorium space that participants were asked to respond to when they split into their groups.

The participants were then split into two tables (Group A and Group B) and asked to discuss large format A1 (and in the case of Group A, A2) prints of the ground floor and first floor plans. Each group had one set of drawings and two representatives from the architecture firm to lead and record the discussions.

There was a significant difference in the conduct of the two groups and in the amount of information that was generated through the discussions. Both groups began with the architects explaining how to read the architectural plans which in this instance had been taken directly from Revit Architecture. They then shifted to try and gather feedback on the plans. The experience of the two groups was very different with Group B having a highly productive discussion while Group A did not.

A number of differences were observed by the researcher and reflected through the participant interviews that appear to have contributed to this difference. Because this assessment is reliant on the researcher's assumptions and a limited number of interviewees who recalled the details of this workshop, it is difficult to establish the weighting of factors that led to such a contrast between the two tables.

In the group that struggled with this activity (Group A), a printing error had meant that the ground floor and first floor plans were printed at different scales. The ground floor was printed at A1 scale while the first floor was printed at A2. This proved to be a significant distraction for many in this group. A significant amount of time was spent explaining how the plans fitted together and introducing the concept of architectural scale. For some at the table, this concept was very difficult to grasp and they appeared to respond by withdrawing from the discussion for a period of time. Interestingly, the discussion moved on when one of the end-users who was familiar with construction drawings explained how the plans worked together to the rest of the group. Either the language they used, or the way they explained the plans appeared to make sense to the other participants and the discussion was able to move forward.

Once the discussion progressed to the specific spaces in question, the architect at this table described the concept of 'curating' the use of the multi-purpose

auditorium on the first floor. Participants did not appear to understand that by ‘curation’ the architect was asking them to think about their use of the space over a week and how they might set-up and pack-down the space in relation to other bookings for the space. Instead, they focused on asking for detail about whether their client groups would have access to the kitchen spaces and store rooms, and how big the space was actually going to be. The architect intervened by again describing the ‘curation of space’. This time, one of the participants turned to the architect and explained very directly that they had no idea what this term meant and asked if they could explain what they wanted in another way. The architect was unable to explain the concept to the satisfaction of this particular end-user and the discussion became very heated and required intervention from other end-user participants at the table to diffuse the situation.

The discussion then became more productive but also adopted a more negative tone, focusing on highlighting things they thought wouldn’t work rather than generating ideas for how they might use the space. This meant the discussion did not uncover any ways in which the space could be made to better suit their needs. Shortly before wrapping up the discussions, the architect again used the term ‘curating the space’, again causing a number of participants to disengage from the process and wait for the larger group to come back together again.

The description thus far has been based on the researcher’s notes, but a similar perspective can also be found in the interview data. One of the participants stated that

> The architect literally wasn’t really speaking the same language as us or really hearing what we had to say. . . nothing was achieved, if anything I got pissed off.

Another recalled that they

> really felt like we were speaking a different language, and that person wasn’t interested in trying to understand our language or our world.

Despite using the same materials and having a similar number of end-user participants and architects in the group, Group B had a much more productive discussion. The critical differences appeared to be that the printed materials were more easily understood through a demonstration of how they could be stacked on top of each other, and that the conversation used storyboarding and scenario descriptions rather than questions. In this group, the discussion was framed as a conversation about potential occurrences in the space. This is very similar to the

concept of curating the space from Group A, but the language was more easily grasped by the participants. Interestingly, on this table, the architects took a less active role in guiding discussions and asking questions, instead allowing the participants to ask questions of the architects that were framed around “will I be able to…?” or “how will it work when…?”.

Discussion

This workshop provides an interesting counterpoint to Workshops 1, 2 and 3, because the researcher was an observer rather than a facilitator. This provided an opportunity for the researcher to use the process of participant observation to develop an understanding of some key elements in the workshop processes. A phenomenological lens was applied to the events that occurred in order to explore why these may have occurred, and in particular, why one half of the room was able to have a productive and generally positive discussion while the other devolved into argument and contestation.

The key theme that was identified as the underlying phenomenological cause of the difference was language, both graphic and verbal. The graphic language difficulties can be linked with a general difficulty in understanding complex plan drawings. In Group A however, this was further complicated by the challenge of discussing the relationship between two plans at differing scales. This can be directly linked with the printing error made by the architecture firm and although not reflected on further in the interview process, this appeared at the time to be a significant learning for the architects involved as well as the researcher.

The challenge of discipline-specific verbal language is exemplified by the use of language that could not be understood by the end-user participants. The use of elite or discipline-specific language correlates strongly with the notions of power and dominance discussed in section 5.4. What this experience highlights is that power differences can emerge accidentally as well as deliberately. The accidental use of discipline specific language emphasises the positional power held by the architects in the process (Northouse 2007; Yukl 1989), and can also be read as a demonstration of how professionals can actively coopt or disempower communities (Kim & Gandhi 2010).

9.4 Other consultation activities

As well as the co-creation workshops that were run by the researcher, end-users were invited to participate in a series of briefing-interviews, information sessions, and other consultation activities. The briefing-interviews, described in section 9.4.1, were conducted by the project management firm to assist with the formulation of a spatial requirements plan and took place prior to the researcher's involvement in the project. The information sessions, described in 9.4.2, and other consultation activities, described in 9.4.3, were conducted by various people from the architecture firm and the internal project management team.

9.4.1 Briefing interviews

The briefing interviews provided a first point of contact for most staff with the construction development process. The project management firm had previously conducted a broad evaluation of spatial requirements based on building and financial data provided by the Uniting Communities executive. This was undertaken as a first step toward evaluating the feasibility of the project and occurred without the knowledge of most of the organisation's staff (and clients).

Once the feasibility of the project had been established and more detailed explorations were approved by the Uniting Communities board, an interview process was used to explore in more detail how the existing spaces were being utilised. The aim of this process was to explore opportunities to reduce the spatial requirements of the organisation and to drive efficiencies in the way that spaces are used. As stated above, these interviews were conducted prior to the researcher becoming involved in the project but are flagged here because they feature in the analysis of the various consultation processes in Chapter 10.

9.4.2 Information sessions

Once the project had been approved by the Uniting Communities board, information sessions were conducted by the internal project management team to introduce staff to the project. These information sessions were then continued in both an in-person seminar format and via internal emails as a way of providing regular updates to staff about the progress of the design, and to suggest any ways in which they might become involved. These updates ranged from day-to-day operational issues related to demolition works and contractors being on site,

through to information about how the project was progressing at a larger scale, and insights into some of the bigger-picture decisions that were being made.

One of the ways the information sessions became particularly useful was in helping maintain a consistent narrative about the project within the staff group. The U City site was previously occupied by a neo-gothic church building that had a provisional but not official heritage listing. This heritage listing was removed by the State Government of South Australia to allow the U City project to go ahead. Unsurprisingly this generated significant negative media attention at a number of stages of the project. Some instances of this media attention are summarised in Table 9.4 below.

Table 9.4: Select South Australian media coverage of events surrounding the development of the U City project from May 2016 through September 2017

Key Event	Title	Media Outlet	Date
Project commencement	"Uniting Communities seeks approval for $80 million building on site of historic Maughan church"	Adelaide Advertiser	23 May 2016
	"Maughan Church is a modernist architectural gem – and it's facing the wrecking ball"	Sunday Mail	4 June 2016
	"Construction of 20-storey high-rise on Maughan Church site likely to begin within months"	ABC News	6 July 2016
	"Gothic Adelaide church faces demolition to make way for multi-use apartment building"	ABC News	8 August 2015
Construction commencement	"Wreckers tear down historic Maughan Church in Adelaide CBD"	Adelaide Advertiser	24 August 2016
	"Final pieces of gothic Maughan Church set to fall"	Adelaide Advertiser	12 September 2016
	"Adelaide's Maughan Church meets its maker as demolition nears completion"	Adelaide Advertiser	23 September 2016
In response to the Grenfell Tower fire in London, UK	"Major city development ditches suspect cladding after safety fears"	InDaily	19 September 2017
	"Uniting Communities redesigns building façade following Grenfell Tower disaster"	The Urban Developer	22 September 2017

A number of information sessions were conducted by the internal project management team and organisation-wide emails were sent out in the days leading up to any media attention to provide staff with information about what was likely to be said about the project. They were provided with an opportunity to ask any questions, and reassured of the value and success of the project. As one end-user put it, the staff were kept highly informed so that

> when we speak to other people about the project, we'll pass along the correct information. But we're also passing on positive information, because there was a lot of backlash with taking the church down.

In the interviews that will be discussed in more detail in Chapter 10, a number of staff pointed to these information sessions as being critical in making them feel a part of the project, particularly those that were not located on the Pitt Street site. For example it was noted that

> Our care workers, particularly our Whyalla care workers [390km from Adelaide] work in isolation. So, for some of them, coming into the office may be only two or three times a year. I guess the value for them is to make them feel that they are included.

Other staff members informally commented on facing questions from their family and friends about the project because of their employment with Uniting Communities and that the information allowed them to respond to any concerns that were raised.

9.4.3 Other consultation activities

Beyond the events and processes that have been discussed above, there were a number of other consultation activities that took place as a part of the design development process. These include events organised by the architecture firm with specific end-user groups, and formal and informal meetings between the internal project management team and other Uniting Communities staff.

Due to research ethics limitations, the researcher was unable to be involved in the events run by the architects with specific end-user groups, but the kinds of processes that took place were captured in the interview data. These events were reported by the architects to have used a discussion-based process, and to have used observational techniques in three dimensional spaces. The architects did not label the processes they conducted, but described a number of elements from the tools evaluated as part of this project. From Table 5.2 (page 110), the architects'

processes can be described as including elements of contextual enquiry, cultural probes, expert interviews, focus groups, guided tour, rapid prototyping, and journey mapping.

Formal internal meetings to gather feedback about the project were primarily structured within the existing framework of the organisation's 'Managers Meeting'. This meeting was attended by all service managers of the organisation and provided an opportunity for the internal project management team to provide updates to the broader staff group, as well as a channel for feedback to travel back to the project management team.

The staff attending this meeting are one level below executive management. The 'Managers Meeting' featured on many of the Value Network Analysis diagrams that will be discussed in 10.3. Interestingly, the inclusion of the development process as an agenda item for this meeting was instigated by one of the senior managers rather than by the internal project management team. This process in some ways aligns with the notion that power and involvement are generally requested rather than offered (Arnstein 1969).[52]

Informal meetings and interactions between the internal project management team and staff of the organisation were also documented through the Value Network Analysis process. These interactions were primarily described as being based on social networks that predated the construction project. Anecdotally, this meant that those staff with a good relationship with those who were seconded to be a part of the internal project management team were able to maintain regular access to information about the project. It should be noted however, that members of the internal project management team did describe significant efforts to ensure all staff had similar levels of access and ability to provide informal feedback.

9.5 Conclusion

This chapter has presented the first part of Case C. It has described the three co-creation workshops that were facilitated by the researcher, a workshop that was facilitated by the architecture firm, and a further series of end-user engagement activities that took place as a part of the construction project.

[52] This was discussed more fully in sections 5.4 and 5.5.

The workshop data that was presented in sections 9.3 and 9.4 provides insight into the processes of applying co-creation methods to projects in the built environment, and describe the processes that will be referenced in the discussion of the semi-structured interviews in the next chapter.

One of the important threads that has been discussed through this chapter is the role of end-user input in the design development process, and the assumption that control over decisions is the primary measure of end-user involvement. This was introduced in the discussion of the first workshop (section 9.3.1) as 'nervousness' on the part of the paying client and the project management team about end-users being involved in decision making processes. The chapter then showed in subsequent sections how this came to be viewed specifically as a problem with the architectural design team responding to end-user rather than 'official client' feedback following the second workshop (section 9.3.2). Finally, the chapter showed how, by the third and fourth workshops (described in sections 9.3.3 and 9.3.4), a process was put in place to ensure feedback was channeled through what were considered to be the appropriate decision making channels.

This has highlighted the tension between end-user engagement and control over decision-making processes that is the subject of the investigation in the second part of this case study (Chapter 10).

Chapter 10 Case C: U City – Part 2

This chapter builds on the previous chapter, exploring the outcomes of the co-creation processes associated with this case through the evaluation of a series of semi-structured interviews. In contrast to the previous chapter, this chapter focuses primarily on the reflections on the process from the participants' perspectives, rather than that of the researcher, and focuses on describes the case in terms of its outcomes rather than its process.

This chapter begins by introducing the semi-structured interview process before presenting two analyses of the data from these interviews.

The first analysis (presented in section 10.2) focuses on the concept of social learning, and uses the lens of Social Practice Theory (Shove, Pantzar & Watson 2012) to explore the type(s) of social learning that may or may not have taken place. This analysis investigates uses the three elements of Social Practice Theory (meanings, materials and skills) to unpack where changes in participants may have occurred.

The second analysis (presented in section 10.3) uses the Value Network Analysis method to explore the question of 'why co-creation?' that has emerged through the experiences of Cases A and B. This analysis is also used to explore the role of influence over decision making in giving value to end-user participants, and to

suggest how the value of end-user engagement in co-creation processes may be being misunderstood by professional consultants.

The discussion in this chapter draws some common threads through the experiences of the case using a phenomenological lens and reflects on the key learnings from the case. As with the previous chapter, this chapter does not explore links between the three cases, nor does it explicitly link the case with the meta-narratives of the thesis: social learning, behaviour change, and sustainability. These discussions will instead take place in the next chapter, Chapter 11.

10.1 Semi-structured interview process

At the commencement of this research, a series of semi-structured interviews were planned that would collect data that would support an analysis of social learning in line with the approaches described in Reed et al. (2010); and Rodela (2011); Webler, Kastenholz and Renn (1995). However, during the research it emerged that there was significant difficulty in communicating the value of treating users as partners rather than subjects. This was evident in both the management of the Adelaide Living Laboratory project in Case A, and the town planner in Case B. Because of this, the interviews were reframed to explore the participation processes and their value in more detail.

Participants in the semi-structured interviews were recruited from the attendee lists of the first three co-creation workshops that were described in sections 9.3.1, 9.3.2, and 9.3.3. All participants, including those from the architecture and project management firms that had been involved in these workshops were invited to participate via an email. Invitations were distributed at the commencement of construction on site, approximately six-months after the final workshop and almost one year since the first workshop. A number of participants had changed their place of employment in this time, and some did not respond to the request. Where alternative contact details were available for these participants the request was forwarded, but only one participant who had left the organisation since the workshops agreed to participate. This led to a final sample size for the semi-structured interviews of 20.

The delay between the experience of the various consultation processes and the semi-structured interviews was considered appropriate by the researcher because it was assumed to give participants critical distance from which to reflect on the

process. The length of this delay is an area that may be an interesting opportunity for further study, in particular because of the influence of time and memory decay on the kinds of experiences that can be recalled (Cowan 2008). For this research, the distance between participation and analysis is seen as encouraging the reporting of double-loop rather than single-loop learning outcomes (Argyris & Schön 1978). The double-loop model of learning, described by Argyris and Schön (1978) is based on the abstraction of experience into a generalisable understanding of the concepts and assumptions that were underlying and informing specific behaviours. For the participants of the case study, this means that they were likely to be reporting on their own critical reflection on an experience, rather than the specific experience itself.

The questions that guided the semi-structured interview process are provided in Table 10.1 below.

Table 10.1: Sample questions from semi-structured interview protocol

Section	Sample Question
1. Introduction	How would you describe your involvement in the U City project?
	How did you find out about the project?
	Why did you choose to become involved?
2. Background	Which of the following have you heard of: Co-design, co-creation, participatory design, collaborative design, living laboratory? How would you describe each of these terms? Can you give any examples?
	What do you think makes a building 'low-carbon'?
3. Co-creation experiences	Thinking specifically of your involvement in this project, what do you remember of the co-creation process?
	Were there any tools or activities you remember? Why?
	What were the best and the most frustrating parts of this process? Why?
4. Value Network Analysis	See separate process diagram in section 10.3 below.
5. Reflection Questions	What was the most important thing about this process?
	Would you choose to engage in a process like this again?
	What would you change about this process if it was to happen again?
	Have you participated in any other form of community consultation before?

Interviews were conducted in locations nominated by participants and were between 45 and 60 minutes in duration. The interviews were audio recorded and transcribed by the researcher. A copy of the transcript was sent to participants after their interview and they were provided an opportunity to clarify or redact any statements they had made. Upon request, two of the interviews were conducted as group interviews with two participants at each. In these instances, each question was responded to by each of the participants.

10.1.1 Differentiating between end-user types

The living laboratory or co-creation literature typically focuses on the quadruple-helix model of innovation, or the public-private-people-partnership and presents end-users as one type of actor in the process (Arnkil et al. 2010; Følstad et al. 2009; Robles et al. 2016; Schuurman et al. 2012). By contrast, the work of Nyström et al. (2014) which explored living laboratory projects through the lens of innovation networks identified multiple role types that can be used to describe different variations of user. These role types were discussed briefly in Chapter 3 and are summarised in Table 10.2 below.

Table 10.2: Actor roles in living laboratories described by Nyström et al. (2014, p.491-92). Break in table indicates delineation between previously described and newly described roles (Nyström et al. 2014)

Role	Description
Webber	Acts as the initiator, decides on potential actors
Instigator	Influences actors' decision making processes
Gatekeeper	Possesses resources
Advocate	Background role, distributes information externally
Producer	Contributes to the development process
Planner	Participates in the development process; input in the form of intangible resources
Accessory provider	Self-motivated to promote its products, services, and expertise
Coordinator	Coordinates a group of participants
Builder	Establishes and promotes the emergence of close relationships between various participants in the living lab
Messenger	Forwards and disseminates information in the living lab network
Facilitator	Offers resources for the use of the network
Orchestrator	Guides and supports the network's activities and continuation; tries to establish trust in the network to boost collaboration which aims at the living lab's goals
Integrator	Integrates heterogeneous knowledge, development ideas, technologies, or outputs of different living lab actors into a functional entity
Informant	Brings users' knowledge, understanding, and opinions to the living lab
Tester	Tests innovation in (customers') real-life environments e.g. hospitals, student restaurants and classrooms
Contributor	Collaborates intensively with the other actors in the network to develop new products, services, processes or technologies
Co-creator	The user co-designs a service, product, or process together with the company's R&D team and the other living lab actors

These roles can be used to describe the ways in which the staff of Uniting Communities are divided into two groups. The staff of the organisation that will become end-users of the building, but are not a part of the internal project management group incorporates users that perform the roles of co-creator, contributor, informant, and interrogator (Nyström et al. 2014). Those staff from the organisation that are involved more closely with the internal project management can by contrast be described as functioning in the roles of orchestrator, messenger, coordinator, gatekeeper (Nyström et al. 2014). These two groups are joined for the purposes of the proceeding analysis by another group, the professional consultants that can be described as having the roles of instigator, webber, producer, planner, and accessory provider (Nyström et al. 2014).

This results in the following groups:

Group 1: Professional staff from Uniting Communities representing themselves as end-users of the building as well as the clients they work with (n=14)

Group 2: Senior management from within Uniting Communities that were involved specifically in leading the construction project (n=3)

Group 3: Professional consultants from the architecture and project management firm involved in the project (n=3).

Figure 10.1 below illustrates these groups as a Venn diagram. This shows the roles taken in the co-creation process by those in the three groups, highlighting in particular the way in which those in Group 2 represent both end-user roles and professional roles in the project.

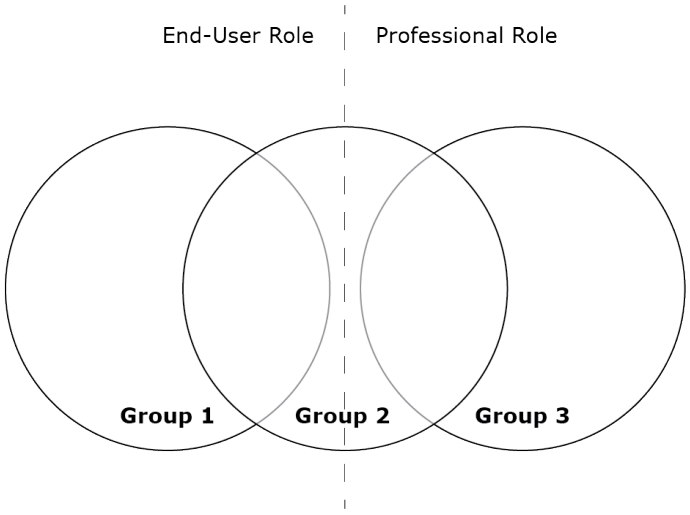


Figure 10.1: Venn diagram of the three groups established for analysis. 'End-User Role' and 'Professional Role' denote the participants' role in the construction project rather than within the organisation.

A further distinction can also be drawn between those in Group 1 and Group 2 through the positional power held by the actors in these groups relative to the project. Reflecting on Northouse (2007) and Yukl (1989) (discussed in section 5.4), Group 1 would be classified as low-power relative to Group 2 within the boundaries of this project. This is despite some participants in Group 1 having significantly higher positional power than some in Group 2 within the organisational structure of Uniting Communities.

The low number of interview participants from Group 2 (n=3) and Group 3 (n=3) limits the researcher's ability to generate inductive theories based on these responses. In the case of Group 2, this is due to a very small number of people fitting into this category. For Group 3, although there were a large number of professional consultants working on this project, there was a limited number that had been involved in the co-creation workshop process or indeed in any form of engagement.

As outlined in Chapter 6, the sample sizes of the three groups (n=14; n =3; n =3) are not statistically significant and therefore are not suitable for drawing generalisable conclusions. The information can however be used to inform the

development of theory (Yin 2009) and be used to augment the phenomenological analysis of the researcher's experiences (Babbie 2016; Yin 2009).

10.2 The Social Practice of co-creation

A summary of the semi-structured interview protocol was provided in Table 10.1 (on page 223 above). This section will focus on the 'background' section of the interviews, while the introduction, co-creation experiences, Value Network Analysis, and reflection questions will be discussed in the next section (10.3).

In section 2.7, Social Practice Theory was described as a way of understanding behaviour change. It was suggested that Social Practice Theory was a useful framework for understanding strategies to direct behaviours to lower-carbon outcomes. A critical part of this understanding is how this works within the realities of construction projects. Social Practice Theory (Shove, Pantzar & Watson 2012) is therefore being used here as a way of understanding the practice of co-creation, i.e. the ability of each of the participants to engage in the co-creation process. For this, the three elements of practice can be understood as:

- Skills: the necessary skills to engage in and make a contribution to the process
- Meanings: an understanding of what co-creation is, and a shared or roughly-aligned vision of what the process is trying to achieve, and
- Materials: the tools, processes and opportunities required to participate in the co-creation process.

The 'background' questions align primarily with the skills and meanings dimensions while the 'co-creation experiences', 'Value Network Analysis' and 'reflection questions' are more aligned with the materials dimension. For this reason, only the skills and meanings dimensions of social practice will be discussed in this section. The discussion of the three dimensions together will take place as a part of the broader discussion in section 10.3.

10.2.1 Results and discussion

The reflective journal entries associated with the co-creation workshops described the participants as being very familiar and comfortable with the concept of co-creation in the workshop sessions. The recognition and description of terminology is being used as a way of testing this observation, measuring the familiarity of participants with the concept of co-creation. An understanding of co-creation or associated concepts is assumed to indicate the possession of the skills required to participate in a co-creation process as well as an understanding of why co-creation

may be used. This means that this data is being used as a proxy measure for the skills and meanings dimensions of the practice of co-creation.

Table 10.3 below presents an analysis of the proportion of people from each of these categories that recognised each term, and the proportion that were able to provide a description of what they thought the term might mean.

Table 10.3: Recognition and description of terminology by participants grouped by actor type

Term		Group 1 (n=14)	Group 2 (n=3)	Group 3 (n=3)
Co-design	Recognition	100%	100%	100%
	Definition	93%	100%	100%
Co-creation	Recognition	71%	100%	100%
	Definition	50%	100%	100%
Participatory Design	Recognition	21%	0%	33%
	Definition	21%	0%	33%
Collaborative Design	Recognition	21%	0%	33%
	Definition	14%	0%	33%
Living Laboratory	Recognition	7%	100%	33%
	Definition	29%	100%	33%

The hypothesis for this analysis was that the end-user participants (Group 1) would be most likely to recognise and recall the term co-creation because this was the term that had been used to describe the workshop(s) they had been a part of. However, the most broadly recognised and described term was co-design. Interestingly, only one participant from Group 1 recalled that the workshop(s) they had participated in were based on the concept of co-creation.

The most common definition of co-creation among these participants was that co-creation was ‘the same as co-design’. Where differences were suggested, these ranged from co-creation being ‘bigger picture than co-design’ to ‘influenced by the end-user but not as involved’, having ‘less specificity’, or being ‘involved in

helping make something [concrete]'. This may be read as suggesting that little connection was made between the process of participating in a co-creation workshop and gaining any further understanding of what co-creation meant, or more likely, an illustration of the participants' professional bias toward the use of the term co-design.

The descriptions given for co-design among the end-user participant group (Group 1) primarily related co-design to service design, which participants reported to be standard practice in the social services industry. Although there is some difference in the complexity of facilitating co-design or co-creation at the scale of urban environments as discussed in Chapter 4, the familiarity with the approach suggests that participants entered the process with a solid understanding of how to participate in the process. It also suggests this group saw value in co-design processes (and therefore co-creation) and understood why it would be applied to the design of a new building. This suggests that the end-user participants entered the process already possessing the necessary skills and a set of shared meanings that enabled them to productively engage in the practice of co-creation.

For participants from Group 2, the internal organisational leadership team for the construction project, co-design was understood in a similar way to Group 1 (above). These participants focused their descriptions on collaboration, communication, and community involvement. Co-creation was described both as being 'a more creative version of co-design', and an 'earlier version of co-design used in visioning prior to a feasibility study'. This group is much smaller than Group 1, but these responses suggest a similar a-priori understanding of the skills and meanings required for the practice of co-creation.

The final group of participants, the professional consultants (Group 3) was again very small (n=3). Unsurprisingly, co-design and co-creation were framed as methodologies for the facilitation of the building design processes. The descriptions of the collaborative processes facilitated by both co-design and co-creation focused on client engagement and on collaboration between the various consultants involved in a construction process. This is in line with the discussion in section 4.3 that explored the value of interdisciplinary collaboration. As with Groups 1 and 2, there was little separation made between co-design and co-creation with the only suggestion being that co-creation was 'the same as co-design but focusing on the creation of a physical object or product'. What emerged

in this very small sample, however, was a subtle shift in an attitude that can be related with the meanings dimension of practice. There was a suggestion that co-creation was ‘popping up more and more from clients’ and that it was ‘being asked for by clients — particularly financial institutions’. These reflections are in line with the attitude of the professional designer described in Case B and suggests that the co-creation process may be seen by professional consultants as something that is instigated and driven by a client rather than by professional consultants.

This data, particularly the suggestion that professional consultants were engaging in co-creation because it was called for by clients rather than because it was considered good practice, suggests that although all groups possessed a baseline knowledge and understanding of the process (skills), there was a discrepancy in the meanings dimension of the practice. This means the understanding of ‘why?’ the various groups would engage in the practice of co-creation was quite different. This supports the hypothesis that was emergent in Case A that professional consultants were not fully engaging with the potential value of co-creation, and that a shift in this attitude may lead to a more effective application of co-creation in projects of this scale.

This section has discussed the skills and meanings dimensions of social practice and highlighted why there is a need to better understand the value of co-creation processes. The final dimension of social practice, materials, will be emergent in the next section through the discussion of the value network analysis process.

10.3 Value Network Analysis

The latter half of each interview was used to create a Value Network Analysis map for each participant. The protocol that was developed for the construction of the Value Network Analysis maps allowed some flexibility while taking all participants through the same 14 stages. These stages are presented in Table 10.4 below. In some instances, stages 6 and 11 were shortened to suit the time constraints of participants but each participant developed a map that they were comfortable with having used as a record of their personal experience of the consultation processes.

It is important to note here the distinction between the consultation process and the co-creation workshops. As will be discussed below, participants were in most cases unable to distinguish between these difference processes, so the analysis

takes the consultation processes as a whole, incorporating the workshops facilitated by the researcher, as well as the other consultation activities facilitated by the architects, project management firm, and internal project management team.

Table 10.4: Value Network Analysis stages with example of instruction provided by the researcher

Stage	Instruction example provided by the researcher
1 Explanation	"On this worksheet we are going to go through a process that will explore how you fitted into the U City construction project, and explore in more detail some of your experiences of participation. The broad rules for the mapping process we are going to go through is that people are in circles, and everything else will be in squares. . . So, events, experiences, emails, flyers, or anything else like that will be in a square while you, any of your colleagues, or people you've interacted with will be in circles."
2. Self	"Can you start by placing yourself in the centre of the sheet, so drawing a circle with your name inside"
3. Activities	"Can you please now add the ways you remember being involved in the U City project . . . Remember anything that isn't a person goes in a square."
4. Links	"Now can you please draw a line between yourself and each of the activities to show that you participated and were connected to it."
5. Other people	"Who else was a part of each of these events? Do you remember anyone from your organisation that was there, or anyone external?"
6. Repeat	Repeat of stage 3, 4 and 5 until no further actors or activities can be added.
7. Value Description	"What I would now like to look at is the value that was being exchanged in this network. When I say value, there are many different forms value can take that are not all about money. Value can also be both positive and negative."
8. Value label	"Using a different colour, I'd like you to trace any of these links, and add a little note alongside about the kind of value you think was being transferred through that interaction. It might be easiest to start with some of the links coming out from yourself."
9. Value direction	"Now that you've labelled the value being transferred, can you add a direction arrow to tell me which way that value was flowing?"
10. Reverse direction	"I'd now like you to think about the value transferring in the other direction. If this is what you were contributing along this connection, what types of value were you getting back?"
11. Repeat	Repeat of stages 8, 9 and 10 until all exchanges that are known to the participant have been described.
12. Scale shift part 1	"I'm going to add another rectangular box on the outside of the sheet here and label it 'the process'. This means the whole process that you have been involved in. Can you describe the value you might have contributed to the process as a whole, and the value you might have received back?"
13. Scale shift part 2	"Now thinking about some of these other actors (based on what has been described in stage 5), what do you think they might have gotten out of the process as a whole?"
14. What's missing	"Let's have another look back through at what we've drawn. Is there anything else you would like to add to the map?"

An A3 worksheet (Figure 10.2) was used to facilitate this process. A wide range of results were generated, such as those shown in Figure 10.3. In instances where the task was not progressing due to participants finding the drawing process difficult, the researcher volunteered to add elements at the direction of the participant.

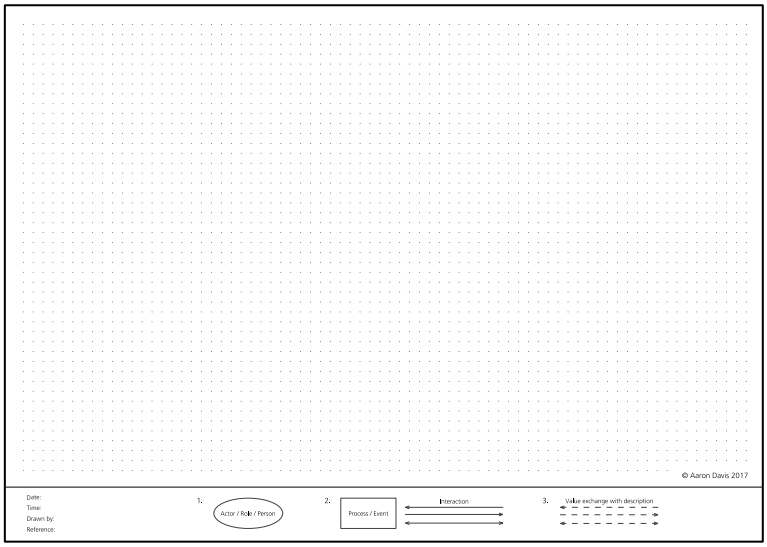


Figure 10.2: Value Network Analysis worksheet

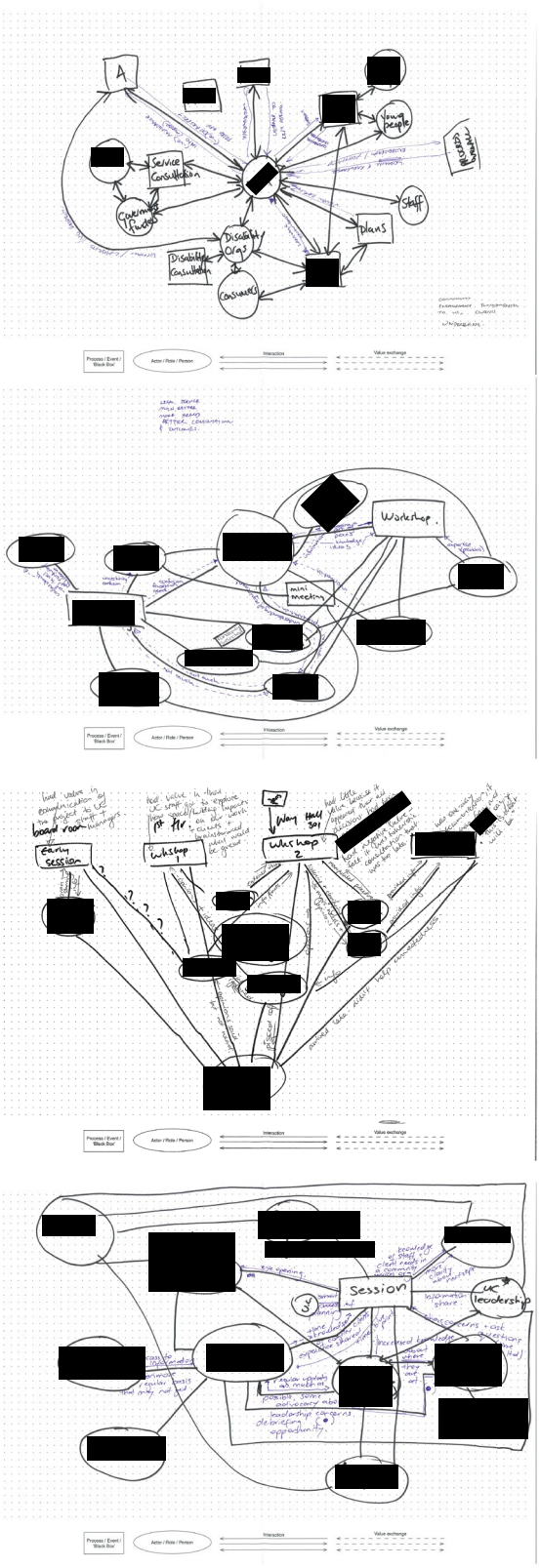


Figure 10.3: Examples of completed Value Network Analysis worksheets (names redacted due to ethics protocol)

During the construction of each network map, conversation was maintained to clarify each of the elements being added to the maps. This allowed the data analysis process to use both the physical artefact and the interview transcript as records of the value exchanges that took place.

The Value Network Analysis process is being used to test the hypothesis that was emergent in Case A and Case B, and reinforced by the Social Practice Theory analysis above, that the value of co-creation processes was being under-recognised by professional consultants. For the purposes of this exploration, the data from Group 2, the client's internal project team has been excluded from the analysis. This is because these participants were representing both the role of end-user and professional in these exchanges. The exclusion of this data allows the analysis to report more accurately on the exchanges that took place between end-user participants and professional consultants. Where members of Group 2 (the internal project management team) have been described in the value network maps completed by participants from Group 1 or Group 3, the role assigned is dependent on the role described by the participant. For example, in some instances, those in Group 2 were referred to as being quazi-professional consultants while in others, particularly those completed by the professional consultants (Group 3), they were described as a part of the end-user group.

10.3.1 Results

The initial collation of value exchanges resulted in the identification of 136 specific exchanges and 72 unique forms of value. Figure 10.4 through Figure 10.7 present a frequency analysis of this data. The figures are organised by both the direction of exchange and the perspective from which the exchange is being described (summarised in Table 10.5 below).[53]

[53] The data presented below as well as some of the analysis that is presented here has previously been described by the researcher in Davis (2017).

Table 10.5: Direction and perspective of value exchange described in Figures 10.4 through 10.7.

Figure	Value Origin	Value Recipient	Described by
Figure 10.4	Professional consultants	End-users	End-users
Figure 10.5	Professional consultants	End-users	Professional consultants
Figure 10.6	End-users	Professional consultants	End-users
Figure 10.7	End-users	Professional consultants	Professional consultants

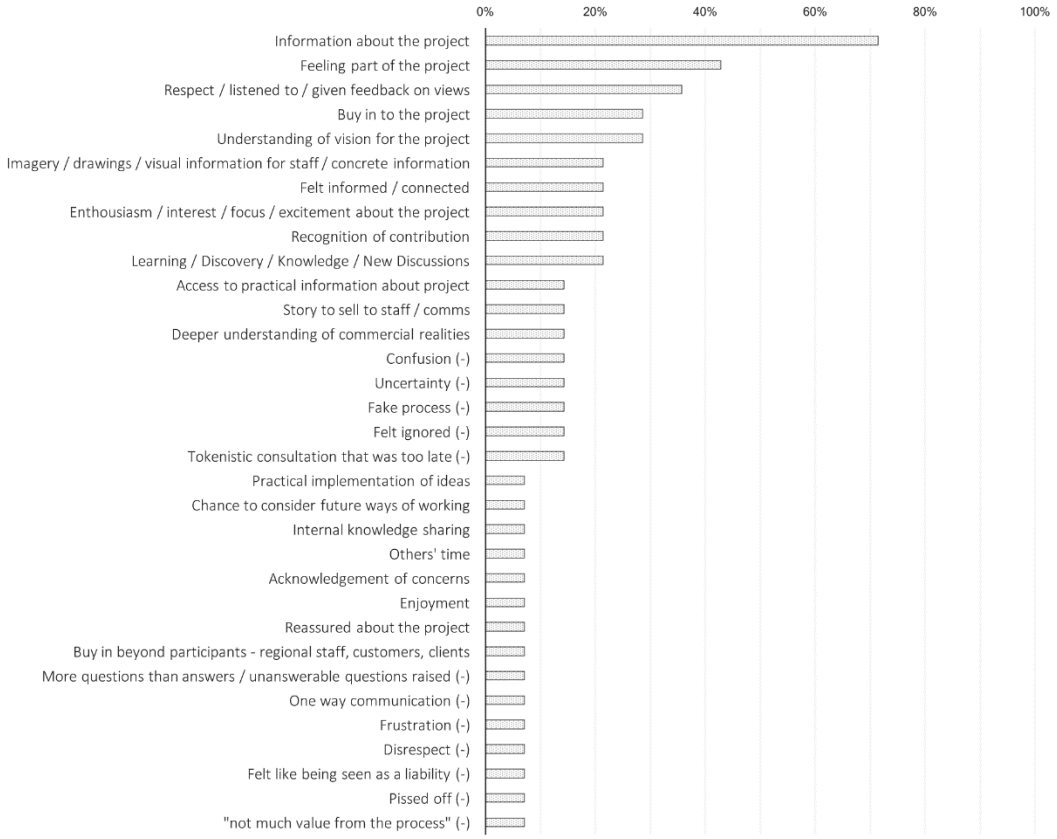


Figure 10.4: The types of value received from participating in co-creation activities as described by end-user participants (n=14)

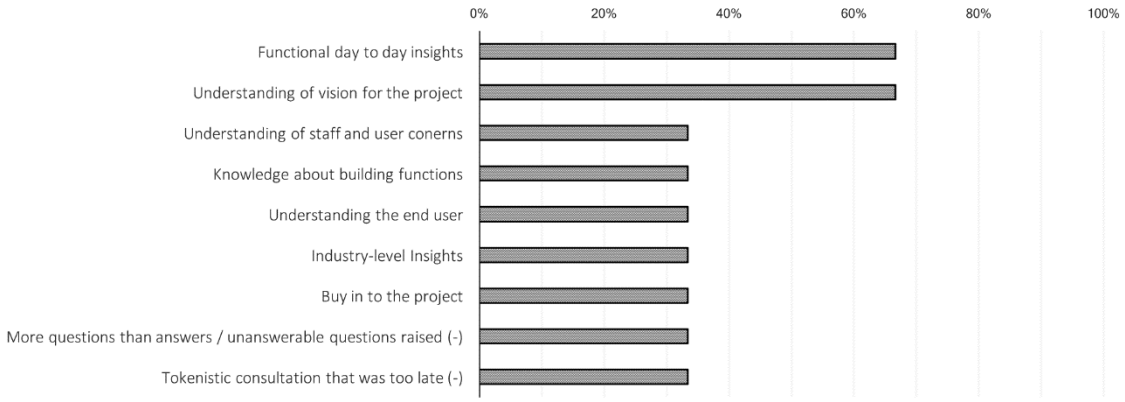


Figure 10.5: The types of value received from participating in co-creation activities as described by professional consultants (n=3)

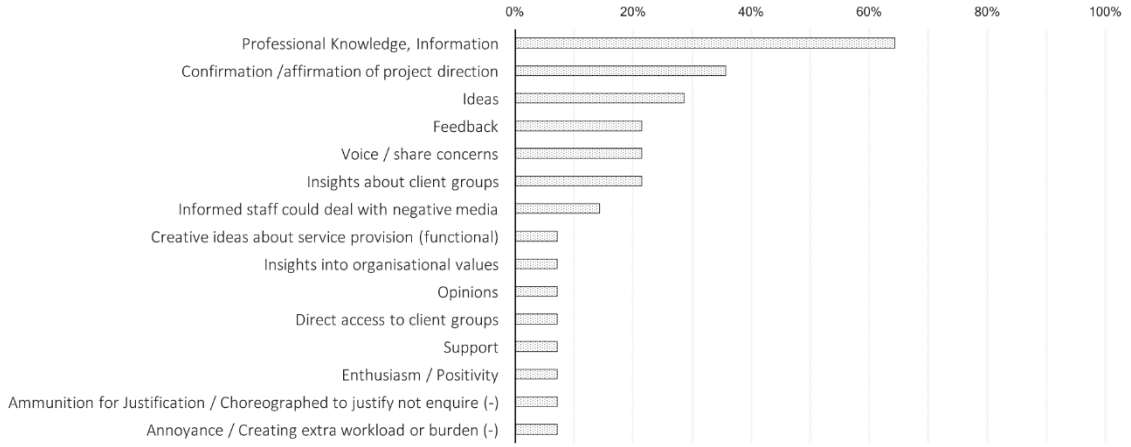


Figure 10.6: The types of value contributed to co-creation activities as described by end-user participants (n=14)

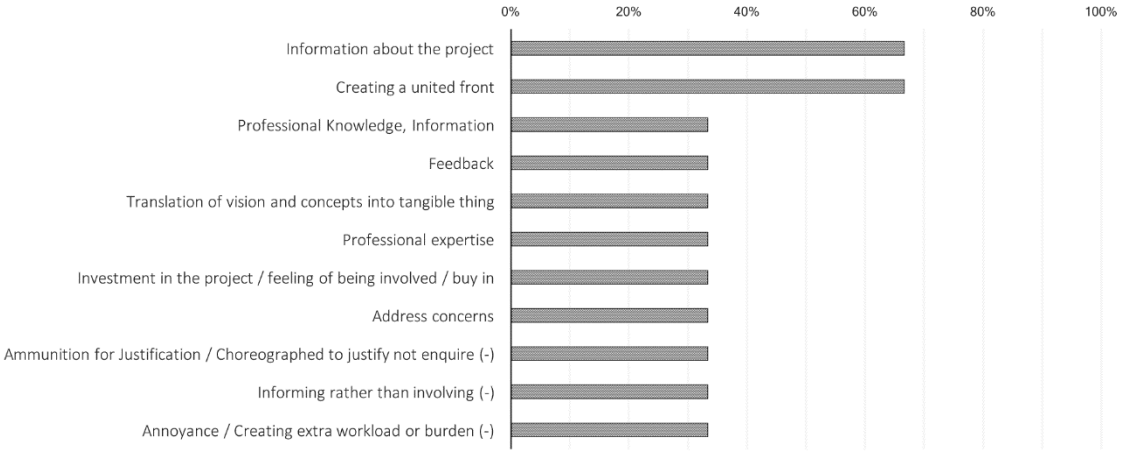


Figure 10.7: The types of value contributed to co-creation activities as described by professional consultants (n=3)

As outlined in the methodology chapter (section 6.6.2), the discussion on value in section 5.8 established that there are no suitable taxonomies of value on which to base a further codification of this data. Instead, an inductive thematic analysis process (Boyatzis 1998) that followed the six step process outlined by Braun and Clarke (2006) (Table 10.6 below) was used to establish eight categories of value. These categories are summarised in Table 10.7.

Table 10.6: The six phases of thematic analysis (Braun & Clarke 2006)

Phase	Description
1	Become familiar with the data
2	Generate initial codes
3	Search for themes
4	Review themes
5	Define themes
6	Write up

Table 10.7: Categories of value resulting from an inductive thematic analysis of Value Network Analysis mapping artefacts and interview transcripts

Category	Sub classification	Examples of data
Concrete	Positive	Design ideas, feedback and advice
	Negative	Specific objections and complaints
Insights	Positive	Professional or personal insights
	Negative	Contradictory insights
Communication	Positive	Information about the project
	Negative	Confusion
Personal	Positive	Sense of worth, enjoyment, satisfaction
	Negative	Annoyance, stress, distrust
Organisational	Positive	Buy-in, change management, advocacy
Other	Negative	Conspiratorial thinking

The first three categories (concrete, insight, and communication) all relate to the exchange of different forms of information. The separation between concrete information and insights can be described as being similar to the separation between single and double-loop learning discussed in section 10.1 (Argyris & Schön 1978). That is, concrete information relates to the expression of specific ideas or features while insights relate to information about underlying conditions and influences. Communication on the other hand relates to the exchange of general information about the project that is outside of the scope of the workshop or consultation activity in question.

The fourth and fifth categories, personal and organisational value, describe value that is related to either the self (personal), or to Uniting Communities (organisational). The differentiation between these value categories will be described further in the second part of the discussion section below. The final categorisation, other, was used for data that did not fit within the previously described categories.

Having refined the data into these categories, the two perspectives on the data can be compared. Figure 10.8 presents a comparative proportional analysis of the data types described by end-user participants and professional consultants for exchanges from end-user participants to professional consultants. Figure 10.9 presents the same form of analysis, but for exchanges from professional consultants to end-user participants.

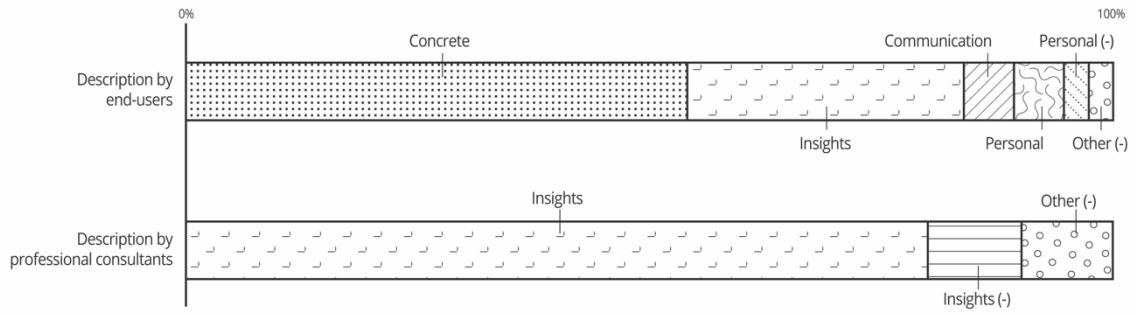


Figure 10.8: Comparative proportional analysis of data types described by end-user participants and professional consultants for value exchanges from end-user participants to professional consultants.

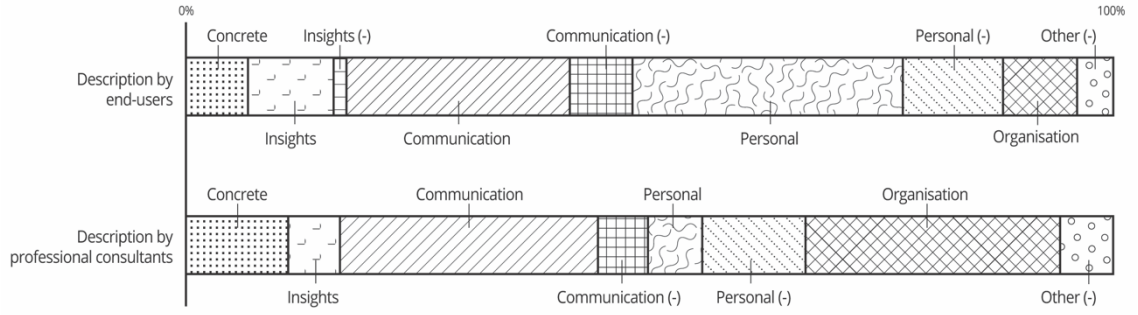


Figure 10.9: Comparative proportional analysis of data types described by end-user participants and professional consultants for value exchanges from professional consultants to end-user participants.

10.3.2 Discussion

The semi-structured interviews and associated value network mapping process generated a range of descriptions of value. In the end-user participant sample, more than half of the specific value exchanges were described by more than one participant, however, across the whole dataset at this level of aggregation there are a number of types of value that were described by only one participant. This makes the external validity of the data difficult to establish at this level of detail (Yin 2009).

When inductive thematic coding (Boyatzis 1998) is used to refine this into broader categories of value however, the data allows for some more interesting, and it is assumed more reliable, insights into the process to be gained. Three key points from this data will be discussed here:

1. the discrepancy in the end-user and professional consultant recognition of the contribution of concrete value from end-users,
2. the differing focus on personal and organisational value between professional consultants and end-users, and
3. the presence of significant amounts of negative personal value being generated through the various engagement processes.

Concrete contributions by end-users

As introduced earlier in this section, the descriptions by end-users of concrete forms of value included descriptions of ideas, concepts, and other specific forms of design-based advice. As shown in Figure 10.8 above, these forms of contribution were not described as being “of value” by the professional consultants. This is not to suggest that the professional consultants would not have considered these contributions valuable, but instead, that when asked to discuss the kinds of value they were receiving from end-user contributions, these contributions were not described.

The interview data suggests that this was not an accidental omission on the part of the professional consultants, with one end-user participant expressing significant disappointment in the lack of recognition of these types of contributions by professional consultants. The participant in this case equated this lack of recognition with an inability to contribute meaningfully to the project, reflecting that

> I have seen on plans, quite specific designs for that space, and I'm like, well, what if we don't agree, the people that are actually going to use the space. Who actually gets to have a say? . . . It wasn't very transparent what decisions had been made, and which decisions were still up for negotiation or could be impacted upon.

Other end-users who also described this phenomenon were more pragmatic in their reflection. One participant expressed joy at being able to make concrete contributions through the process while at the same time acknowledging that it was unlikely his ideas were being seen as valuable. He suggested

> Our ideas might be misinformed, probably emotional, and maybe less than one percent of the whole process. But the very fact that you've actually felt like you've contributed, you've felt like you've been respected. . . I feel sorry for these guys because they've got to filter out all our bad ideas, and that's part of their job. But we feel respected, even if we don't contribute. . . we still feel like we're part of the story.

This notion that professional consultants were not interested in the ideas of participants was also inferred by the behaviour of some professional consultants during workshop sessions. An end-user participant in workshop one, for example, reflected that

> it felt like that person didn't even really need to be in our group, if they've already got this whole idea of what it's going to look like, then, even, I felt like perhaps even what we chose wasn't going to be taken seriously in a way.

Despite this, there was a general recognition among participants that they were contributing both concrete ideas, and insights into their organisation and the services they delivered. This suggests that participants were cognoscente of the different types of contributions they were making, but also that something was causing them to continue to make concrete contributions despite feeling as though they were not being listened to. Of course, this may be attributable to an innate desire to make these kinds of contributions, but the researcher's experience of the workshops described in section 9.3 suggest that the facilitation tools and techniques may have had an impact on the types of contributions being made, and therefore, on the type of value end-users perceived they were contributing to the professional consultants.

This returns the discussion to the materials dimension of social practice hinted at in section 10.2 and highlights the important role the facilitation tools may play in guiding the kinds of contributions end-users perceive they are 'supposed to' make. The case study approach is not suited to establishing causation between the tools

used in workshops and the type of feedback offered by end-user participants. However, a tentative link might be drawn between the use of construction drawings and the detail-oriented or concrete contributions being made by end-user participants.

Reflective journal entries relating to the workshops and other consultation processes that were facilitated by both the project management firm and architecture firm (discussed in section 9.4) discuss a number of instances where architectural plans were used to facilitate discussions, and the professional consultants were frustrated by the kinds of (concrete) responses they were getting. As well as potentially eliciting the 'wrong' form of contributions, technical architectural drawings (plans, sections, and elevations) also caused significant confusion among participants. These drawings are utilised as a standard form of communication in the construction industry, but their use in engaging users in this case study brought significant translatory challenges to the process. One of the interview participants from Group 2, the internal project management team, recalled how

> on the plan would be a G.P.O. and the staff would be scratching their heads thinking G.P.O. means General Post Office, not General Power Outlet. The amount of times they had to be told again, that's actually a power point. And there were all sorts of things [I was] continually translating.

Another participant recalled that

> we got to see the designs at the time, but it was again, you looking at something quite complex. You have about fifteen people around a table with one design . . . we've all got different questions, and different ways of even reading a design. We're not architectures [architects]

The approach taken in the co-creation workshops that were facilitated by the researcher was to generate bespoke materials to facilitate discussions that would elicit specific kinds of responses. This appears to have been successful with anecdotal evidence such as

> in the first one I remember we did [Workshop 2], it was, well it felt like a good exercise in terms of there was a progression of things so it was kind of like, one, talk about the clients that you work with, and then two, think about the space because of those clients and then three, think about something . . .

This is in contrast to this same participant's experience of Workshop 4 (section 9.3.4) where discussions were facilitated using (industry standard) working drawings.

> In the second one, yeah, the second one [Workshop 4] it felt more like, you know, maps, designs had already, not designs, well, when I say designs I think interior designs. Well, there were clear floor plans and a lot of decisions had been made. And it really felt like what, to be honest, we were being asked stuff, but it wasn't going to change anything. So that, yeah, that was really frustrating.

Another participant described how

> there were diagrams, large architectural print-out diagrams. . . it was clearly several versions along and they looked like lots of time and effort had gone into them. They were not someone's initial scratchings [that we were being asked] "what do you think?" about . . . I remember feeling like they've decided already.

These experiences suggest the use of bespoke materials by professional consultants may be able to steer the feedback they are given toward insights rather than concrete design advice. However, the approach taken by the researcher involved investing significant time and resources into the development of specific materials for each workshop.

Rather than suggest consultants should develop bespoke facilitation materials, it may be more useful to interrogate why, on a project where a three-dimensional model was being constructed, a combination of two-dimensional plans and static photo-realistic renderings (produced for marketing purposes) were being used to facilitate the discussion of spatial concepts. Salter and White (2013) highlight the importance of visualisation techniques when soliciting feedback on something that is outside of a user's typical experience. Within architecture, research by Brause (2016) and Haukipuro, Heikkinen and Kivimäki (2013) found soliciting feedback from three-dimensional models to be more successful than relying on two-dimensional drawings.

With continuing growth in the use of Building Information Modelling (BIM) globally (McGraw Hill Construction 2014), there may be an opportunity to explore how three-dimensional models can be used as a resource for facilitating co-creation processes and steering end-users toward giving the kinds of feedback that are being sought by professional consultants. This suggests there may be opportunities to explore overlaps between this research and the BIM literature.

This research focuses on the value of engaging with end-users during design processes; in the BIM literature there is significant interest in the value proposition of clients investing in BIM. The BIM literature to date has focused primarily on the benefits of BIM in driving efficiencies in the construction phase, and the

potential future benefit of models being used to drive more efficient building management systems (Gu & London 2010). These arguments return to the theme from Chapter 2 where efficiency and engineering-based models focus on technological rather than sociotechnical solutions. Investigating the value of BIM through its application in end-user engagement may be significant for both the BIM and co-creation literatures and is an area of interest for future research.

Regardless of whether focusing on BIM or bespoke materials, the disparity found in the recognition of value contributed by end-users described in Figure 10.8 suggests there is a need for further research to investigate the impact of tools and processes on the kinds of contributions being made by end-users.

Characterisations of personal and organisational value

The discussion above suggested that concrete contributions from end-users were not seen as being particularly useful by professional consultants. However, there is further nuance in the interview data that suggests that in some cases, the professional consultants were able to work with these contributions in a way that still generated value for the end-user participants, even if not for the professional consultants. One of the important roles that appears to have been played by some professional consultants in this process is the transformation of contributions that are not professionally useful, into personal value for the end-users. In the previous discussion an end-user participant was quoted as stating

> Our ideas might be misinformed, probably emotional, and maybe less than one percent of the whole process. But the very fact that you've actually felt like you've contributed, you've felt like you've been respected. . . I feel sorry for these guys because they've got to filter out all our bad ideas, and that's part of their job. But we feel respected, even if we don't contribute. . . we still feel like we're part of the story.

As well as acknowledging that the contributions being made might not have been useful, this statement gives clues to the important role played by the professional consultants in actively listening to end-user participants and providing value through the way they respond. This was recognised as being a part of the co-creation process to some degree by the professional consultants, with the assertion that

> The whole role of co-creation is to create a process which eventually creates ownership over the space, as opposed to just giving them something. I think that through those sorts of consultation processes they feel like they were involved. even if it's "oh they didn't listen to me" or something like that, at least they can say that they were involved.

A similar suggestion was made by another consultant who suggested that end-users who participate in co-creation activities

> absolutely get that buy-in, so they feel involved in the process. So, it's not consultation, we were asking for their contribution, so they felt that any of their concerns were heard, and that they were addressed. Not necessarily given exactly what they wanted, but understanding the decision-making process.

Despite recognising this process and its importance, the statements above focus on this being of value for 'the project' or for the organisation (Uniting Communities) instead of for the individual end-user participants.

In reflecting on one of the few instances where the professional consultants were able to work directly with a client group, participation was indeed linked with a highly personal form of value. In reflecting on a small workshop that involved two men with muscular dystrophy, one of the consultants remarked that

> I think they probably got a sense of value that there's about ten people around the room, really intently listening to what they have to say. I think that's probably important. That they're part of the group. I would say, it's kind of recognition as a person.

What this suggests is that the value described as being given to the end-user participants from the client organisation (Group 1) was described by professional consultants (Group 3) in terms of benefits to the organisation rather than the individual. The value for end-user participants that were not from the client organisation by contrast appears to be described in terms of personal value. A possible explanation for this is that the closer link between the formal client (the organisation) and the staff participating as end-users (Group 1) led to these end-users being seen as 'clients' that were participating as a way of helping their organisation while the muscular dystrophy patients were seen as 'true' end-users that were participating on a more personal level because of a more distant connection with the organisation.

This phenomenon has emerged from the analysis of the professional consultant interviews. Because of the small number of interviews involved (n=4) it is difficult to suggest the prevalence of this phenomenon. However, in the context of the broader goal of understanding the value of applying co-creation in urban environments, it suggests that it is possible that some professional consultants may see participants with a vested interest in a project (stakeholders) differently to those that are less directly connected, and therefore, engage with these people in a different way. This is not immediately problematic; however, the next part of this

discussion will explore whether this separation can be linked with negative behaviours and experiences.

The acceptance of negative value

Figure 10.9 (page 242) demonstrates that both end-users and professional consultants reported negative personal value as a contribution that was being made by professional consultants to end-users.

From the end-user perspective, the feeling of not being able to contribute in the way they thought they were being asked to resulted in them reporting receiving negative personal value. One user recalls during a discussion in Workshop 4 (described in section 9.3.4) that

> [They] were asking our opinion on decisions that had already been made. The architect literally wasn't really speaking the same language as us or really hearing what we had to say. . . nothing was achieved, if anything I got pissed off.

While this may be seen as being related to the attitude and assumptions made by the end-user, another compared their experience of interacting with the architecture firm and the construction company. She described how

> I felt more comfortable with [the builder]. When we were in the meeting with the architects they actually shut the architect up and turned around to me and said 'what do you want?'. They got that I wasn't being listened to, and they asked, and I thought wow. . . I felt like I was truly listened to by them and they wanted to hear it and they picked up that [the architects] weren't listening to us. … pissed off basically is how I felt, I felt pissed off. . . I thought [the architects] were the ones that would get this and the builders wouldn't, but the builders did get it.

This suggests that the difference may be attributable to the behaviour of the different professional actors involved.

As Figure 10.9 (page 242) shows, negative personal value being delivered to end-user participants was reported by both end-users and professionals. A representative from the project management firm described their frustration at how

> the majority of these people were clueless to the process. They did not understand the construction process or the design process. They were too concerned about "am I going to lose my office? I really need an office."

She then went on to say that

> I wouldn't have been surprised if people took stress leave after the interviews. They weren't in any way confrontational, but they start to get concerned.

This may perhaps be symptomatic of a broader attitude held by this firm about the role of consultation. A member of the internal project management team (Group 2) went as far as suggesting that this particular firm would probably have preferred to work exclusively with the CEO and that any efforts by others to pursue more meaningful consultation were 'capped or controlled' by this firm.

The acceptance by this consultant of upsetting participants also provides a more nuanced illustration of the potential consequence of separating personal and organisational value described above. Had the experience of the individuals been considered as more important than the needs of the project or the organisation, it is assumed that these interviews would not have been conducted in such a confrontational manner. The overriding importance of achieving value for the project established through seeing the end-user primarily as a stakeholder rather than a person, can be linked with the rationalisation of this negative value as being part of organisational change and stakeholder management.

The experience described by the project management consultant can be argued to represent a rational rather than critically pragmatic approach to designing the consultation process (see Forester 2013, discussed in section 5.5). It might be suggested that the professional consultant could instead have used a critically pragmatic, and therefore dialogic rather than dialectic, approach to acknowledge and listen to end-user concerns rather than summarily dismissing them. While this may not change the outcome from a project perspective in the way it did in the example given by Forester et al. (2011), it may result in more end-users reporting feeling 'listened to despite . . .' , 'heard even though . . .' and 'grateful for the opportunity to . . .' and less reporting being 'pissed off by . . .', 'annoyed by . . .', and 'frustrated by . . .'.

10.3.3 Limitations of the data

As described throughout the preceding section, the primary limitation in the Value Network Analysis process is the relatively small sample size of professional consultants. This has been acknowledged and reflected upon wherever phenomena are read into this data.

The analysis would also have benefited from more certainty about which consultation events were being referred to in the interview data. However, most participants were unable to recall which co-creation workshop or consultation

event they had participated in, and often could not differentiate between the various professional consultants that they had met. Instead, terminology such as a 'session' or 'workshop' was used for a number of different event formats and 'the architects' or 'the designers' as a coverall for professional consultants.

10.4 Conclusion

This chapter has built on Chapter 9 to describe the outcomes of Case C from the perspective of end-user participants and of professional consultants. The analysis presented in this chapter has used data from semi-structured interviews to investigate the outcomes from, and value of, the co-creation processes in this case.

The findings in this chapter have suggested that end-user participants in this case were well equipped to take an active role as co-creators, but that the assumption they were seeking power over decision-making processes (also described in Chapter 9) may have limited their opportunities to be engaged in the process.

This chapter has suggested that the professional consultants' view of co-creation as being something that is generally instigated and driven by their paying client rather than by them, is reflective of a lack of understanding about the value that can be generated by a co-creation process.

The value generated through the co-creation process was suggested in the Value Network Analysis to be understood differently by professional participants and end-user participants. The analysis also suggested that a significant amount of the value being described by end-users is related to the opportunity to participate in the process rather than influence outcomes, something that is not well recognised by the existing consultation evaluation frameworks that were described in Chapter 5.

Finally, the chapter discussed the role of co-creation tools in the delivery of value for both end-user participants and professional participants, and the acceptance of negative value in consultation processes. These were flagged as areas for further research, and will be reiterated in the final thesis conclusions (Chapter 12).

The next chapter will discuss the broader implications of this case study alongside those of Case A and Case B in a cross-case discussion.

Chapter 11 Cross-case discussion

This chapter is structured around the primary themes that have been discussed throughout this thesis: carbon reduction, behaviour change, and living laboratories. It discusses the relationship between these themes and the cases that have been presented in the preceding three chapters, highlighting in particular where contributions may have been made to these areas of knowledge and where there is need for further investigation. This chapter will build on the discussion sections in each of the case study chapters and reflect on how the cases relate to each other in the context of this literature.

As described in Chapter 6, comparisons made between cases help to establish both internal validity and external validity (Yin 2009). The comparisons that are drawn across the cases allow the phenomenological theories that were emergent in the cases to be explored in different contexts. Some theories, such as an under-recognition of the value of co-creation by professional participants will be supported through similarities between the cases, while others, such as the differentiation between a vocational end-user and a personal end-user, emerge more strongly through the differences between cases.

The chapter draws links across the three case studies and with the literature discussed in earlier chapters. The chapter is focused on exploring the learnings from the cases in the context of three key discussions:

- the place of social research in efforts to reduce global $CO_{2\text{-eq}}$ emissions
- the conceptualisation of Multi-Level Perspective through Social Practice Theory and resilience as a way of understanding macro-scale sociotechnical change, and
- the contribution of the cases to knowledge about urban living laboratories.

11.1 Carbon reduction

In Chapter 2 the relationship between urban environments and global greenhouse gas (GHG) emissions was introduced alongside two key ways of understanding behaviour change: Multi-Level Perspective from Sustainability Transitions (Geels 2002) and Social Practice Theory (Shove, Pantzar & Watson 2012). After introducing some of the headline statistics about the importance of the built environment in efforts to address climate change, this chapter explored why approaches based on reducing GHG emissions through efficiency were not likely to achieve the kinds of reductions necessary to avoid significant global temperature increases. To support this assertion, this chapter cited phenomena such as the Jevons Paradox (Jevons 1865) as well as a number of publications citing the need to treat GHG emission reduction as a social innovation challenge (IPCC 2014; Manzini 2006, 2011; Manzini & Tassinari 2013).

The Cooperative Research Centre for Low Carbon Living (CRCLCL) and the Adelaide Living Laboratory project were established to help Australia achieve the $CO_{2\text{-eq}}$ emission reduction goals described by both the IPCC (2014) and the IEA (International Energy Agency 2012). It is unsurprising therefore that many of the projects described in section 7.2 have clear and quantifiable links with $CO_{2\text{-eq}}$ emission reductions. The researcher's experiences of the Adelaide Living Laboratory and CRCLCL (described in Chapter 7) can be read to suggest there was a general attitude within these organisations that technological development needed to happen before social change could take place and that the question of behaviour change, while closely linked with technological development, was still somehow separate. Despite this organisational attitude at a general level, the experience of the specific project in Case B (Chapter 8) linked social innovation processes with technological development. This link is also visible in Case C (Chapter 9 and Chapter 10).

Case B and Case C were therefore aligned with the Social Innovation approaches called for in the literature, including by the IPCC (2014), while the approaches seen in Case A appeared to have been more technologically focused, adopting a more linear understanding of the behavioural dimension. Linear models, such as the theory of planned behaviour and the transtheoretical model of behaviour change that were discussed in sections 2.7 and 2.8 (Ajzen 1991; Prochaska & Velicer 1997) were suggested to be suited to framing individual behaviour change, but not to understanding broader social changes.

Approaches based on Social Practice Theory by contrast, were highlighted as being more suited to macro-scale change. Interestingly, the intention of both the CRCLCL and the Adelaide Living Laboratory appears to have been conceived with a Social Practice-based understanding of behaviour change in mind. The research presented in Chapter 7 suggests it was in the translation of this intention into research practice that technological development and linear models of behaviour became privileged.

The linear approach that emerged in Case A was perhaps best illustrated by the anecdote presented in 7.3.3. Here, the request to "do some co-creation" after the building's efficiency had been ensured through a careful (and subsequently highly-awarded) design process suggests that the social elements of low carbon living were considered after the technological development.

By contrast, in Case B and Case C, the approach was more closely aligned with the three dimensions of social practice: meanings, materials, and skills (Shove, Pantzar & Watson 2012). Interestingly, it is much harder to quantify the link with GHG emission reductions in these cases. While these cases are strongly linked with the social innovation approaches called for by the IPCC (2014), it is not clear from the research that has been presented whether there is a method for interpreting the GHG emission impact of the meanings or skills dimensions in isolation, nor these dimensions and the GHG emission consequences of the material dimension. The approach of capturing social learning (described in sections 8.2.3 and 8.3) may provide a way forward, but this was beyond the scope of this research.

This suggests that the broader contextual limitations of Case A, including the need to demonstrate a reduction in greenhouse gas emissions, make social innovation-

based research and actions difficult to reconcile with the structures of a technologically-focused living laboratory. In effect, defining the primary goal of the Adelaide Living Laboratory as reducing $CO_{2\text{-eq}}$ emissions, rather than for example improving resilience, or enhancing community preparedness for the effects of climate change, can be linked with the quantitative and technologically focused research methodologies that were used across the Adelaide Living Laboratory project and the CRCLCL more generally.

11.2 The cases' impact on behaviour through a Multi-Level Perspective and social practice lens

The latter half of Chapter 2 focused on exploring the relationship between Multi-Level Perspective and Social Practice Theory (Geels 2002; Shove, Pantzar & Watson 2012). In section 2.9 it was suggested that the three levels of Multi-Level Perspective (niche, regime and landscape) could perhaps be understood through the relative complexity and resilience of the assemblages of social practices. The ways in which the cases approached large scale change through the links between niche and regime or landscape levels can add further depth to this discussion.

Case A primarily focused on promoting actions at the regime level with a significant focus on government intervention, legislation, and industry-wide processes. The specific projects operated at the niche level, but many of the outputs from these projects (primarily recommendations and targets) were aimed at catalysing changes at the regime-level. Case B for example, operated at a niche scale but was also focused on catalysing change at the regime-scale by developing an understanding of how the co-creation processes could work at the urban scale (see section 8.3). For example, the concept of a co-creation toolkit that was discussed in practical terms in section 6.6.4 and more contextually in Chapter 7, was specifically aimed at helping urban-renewal authorities, such as Renewal SA, to apply co-creation to projects in the built environment.

There appears to have been an assumption in Case A (and therefore also in Case B) that broader landscape level changes would occur as a result of changes at the regime scale. This assumption is perhaps based on the tipping point model introduced in section 2.6 or the concept of a nudge described by Thaler, Sunstein and Leonard (2008).

In the early part of the Lochiel Park development (discussed in Chapter 7), a series of pilot projects were undertaken that involved and therefore educated industry partners at the niche scale. This was combined with legislative action at the regime scale to catalyse broader change in the South Australian construction industry (Berry, Davidson & Saman 2013). Although the resulting shift does not satisfy Geels' (2002) conception of a sociotechnical landscape, it can be seen as representing a shift in a very complex assemblage of practices. In this example, the development of above-industry-standard suburban housing provided a demonstration to the construction industry that higher-efficiency construction was possible in South Australia, easing fears of legislating a minimum energy performance rating within the Building Code of Australia (Berry, Davidson & Saman 2013). The Lochiel Park project can therefore be seen as catalysing a broader shift in the industry by combining industry involvement in a successful low-carbon development at the niche scale with legislative changes at the regime scale.

The process of change that took place can also be unpacked through a social practice lens; all three dimensions of Social Practice (meanings, materials and skills) can be seen as shifting within the construction industry. The meanings dimension relates to the shift in industry perception that resulted from the demonstration that high-efficiency housing could fit within current business models; the materials dimension is addressed through the 2013 rise in minimum energy efficiency standards within the Building Code of Australia; and, the skills dimension relates to the development of skills among various trades to construct buildings that are of a higher energy efficiency standard.

It is interesting to note here that the material dimension is linked with a legislated minimum standard. At the time of construction (c. 2010–2013) the technologies for constructing high-efficiency homes already existed and had been used in many other parts of the world. This meant that the materials component of practice was not the development of new materials, but the establishment of a legislative environment that forced their use.

This is particularly interesting to consider in the context of the distinction between a technologically-oriented and a socially-oriented living laboratory that was made in sections 3.2 and 7.3. The example highlights the way in which the materials component of social practice can be seen as reorganising elements of the regime

scale to facilitate access to existing materials (through legislative or market-based changes) rather than the technological development of new materials. By focusing on the materials dimension of social practice solely as the creation of materials through technological development rather than the facilitation of access through regime-scale shifts, technically-oriented living laboratories may miss opportunities to engage with the other dimensions of social practice (the meanings and skills dimensions) and opportunities to create sociotechnical innovations.

Case B and Case C can both be described as niche-level action that was intended to catalyse larger scale shifts in the development industry. Both cases focused on the development of a highly-specific site within well-defined parameters but the way they related to the regime-level (and perhaps landscape-level) was driven and conceived somewhat differently. As has been described above, the research component of Case B was focused on the establishment of legislative and procedural frameworks to enable the use of co-creation in the built environment. By contrast, the research in Case C was focused on linking the niche level action with regime-level changes through a bottom-up or industry-led change. This bottom-up approach is based on one of the primary themes of this thesis: viewing co-creation and collaboration with end-users as an asset rather than a liability.

In section 5.2, two models of end-user engagement in the built environment were described: the first was based on the legislated minimum requirement for consultation based on citizens' right to participation while the second focused on voluntary engagement with end-users through the recognition that this engagement would deliver value for a project. The second model was described in Chapter 5 through the notion of democratic design experiments (Binder et al. 2015), however, as Case C demonstrates, a Value Network Analysis process can translate the theoretical proposition of Binder et al. (2015) into measurable forms of value exchange. Although a cost-benefit analysis was beyond the scope of this research, the under recognition of value by professional participants that was described in section 10.3 suggests there is significant value that is not being taken into account when considering the cost-benefit of end-user engagement.

This indicates an opportunity to advocate for greater end-user involvement without focusing on legislation, and begins to establish a case for bottom-up or industry-led regime-scale change in the sociotechnical systems (or assemblage of practices) associated with user-engagement.

11.3 The urban living laboratory

Section 3.4 drew a series of distinctions between a living laboratory and an urban living laboratory, primarily from the work of the Governance in Urban Sustainability Transitions (GUST) network (McCormick & Hartmann 2017). The GUST network define urban living laboratories as featuring

- geographic embeddedness
- experimentation and learning
- participation and user involvement
- leadership and ownership, and
- evaluation of actions and impact (McCormick & Hartmann 2017).

The sub-sections that follow will describe how the three cases relate to and further the understanding of the GUST principles. It should be noted that although Case C was not formally a part of an ENoLL accredited living laboratory, the methodological approach and use of co-creation allows comparisons to be made.

11.3.1 Geographic embeddedness

The first two elements of the GUST definition of an urban living laboratory are perhaps the most obvious and easiest to demonstrate through the cases presented in this research because architecture and indeed most disciplines relating to urban environments are necessarily geographically embedded. The three cases demonstrate this through the establishment of defined boundaries for action as well as participation. In Case A, the three sites of the Adelaide Living Laboratory were defined through geographic and legislative boundaries although participation in projects was perhaps more closely aligned with project requirements rather than geographic specificity. An exception to this is Case B in which participation was restricted to a very specific community. The snowballing recruitment process did allow participation beyond the initially defined boundaries but this had minimal impact on the participant group. Case C also featured a very specific site and participant group because it focused on the development of a single building and engaged for the most part only with the organisation's staff.

11.3.2 Experimentation and learning

The three cases take very different approaches to the concept of experimentation and learning. Many of the projects within Case A were described as applying a physical sciences-based understanding of research and experimentation, relying primarily on quantitative research methodologies. In much of this research, efforts

were made to minimise the disruption caused by uncontrolled variables including in some cases, users. This can be seen in projects such as the collection and analysis of smart meter data from homes at Lochiel Park where users can be seen as having being treated primarily as subjects rather than as partners.

There were of course exceptions within the Adelaide Living Laboratory, such as the parklands community garden described in Case B. In this case, the focus of experimentation and learning was on participants experimenting and learning as much as the researcher experimenting and learning. Here, the process of social learning as a framework for knowledge development among participants was evaluated, as was the way in which the co-creation process supported community development.

In Case C the experimentation and learning dimension is not present in terms of a social learning approach but can be described through the architectural design process and this research. The unique nature of the design brief that the architects were working with in this project necessitated some level of experimentation and learning, both about the tangible requirements of the building's future users, and, more importantly for this research, about the role they played within a co-creation process. As demonstrated by the procedural shakeup described in sections 9.3.3 and 9.3.4, the role of the architects in terms of their responsibility to the researcher, the end-users, and the executive was emergent through the process. This meant they were experimenting with their own processes, and developing new knowledge about how to work with groups of stakeholders that have conflicting values and priorities (Quinn 1988). This is reflected in the development of a structured process for evaluating the information that is generated through engagement with user groups, prior to making significant design decisions (discussed in 9.3.4).

11.3.3 User participation and involvement

Chapters 3, 4 and 5 developed this thesis' understanding of the role of the user in urban living laboratories. The research discussed in these chapters focused primarily on the structures within living laboratories and urban living laboratories that related to the conception and treatment of end-users, as well as the kinds of organisational role end-users may have in a project (Nyström et al. 2014; Sanders & Stappers 2008). Across these chapters, the evocative binary between users being

either subjects or partners was introduced alongside a differentiation between two broad categories of living laboratories: socially-oriented and technically oriented (Franz 2014). The experience of the cases suggests that although this binary is useful at a conceptual level, in practice, the role of the user and focus of living laboratories is more nuanced.

The approach to user participation and user involvement varied across the three cases and each faced different challenges in engaging with users. The primary issues that will be discussed in this sub-section are

- the distinction between a user-as-subject and a user-as-partner model of living laboratory activities as introduced in section 3.2,
- the relationship between complexity and the approach taken to user engagement, and
- the notion of proxy-user involvement.

User-as-subject and user-as-partner

Within the Adelaide Living Laboratory project discussed in Cases A and B, there are elements that align with the user-as-subject model of living laboratory and those that align with a user-as-partner model. Where the user-as-subject model was applied, users were often a part of the research, but participated at a distance from researchers. This took on a variety of forms, including being passive sources of data or test-subjects, and more active participants as user-testers of innovations and ideas.

As discussed in Case A, the user-as-subject model of research inherited by the Adelaide Living Laboratory was difficult to shift away from once it had been instigated. However, this did not compromise the researcher's ability to embark on projects where users were treated (for the most part) as partners such as in Case B. In Case C, the notion of users-as-partners or users-as-subjects was blurred by the various consultation activities that took place. Some activities, such as the generative co-creation exercises discussed in sections 9.3.1, 9.3.2, and 9.3.3 can be seen as treating users as partners while others, such as the participant interviews discussed in 9.4.1 can be seen as treating users as subjects.

Across the cases it would appear that the role of the user was linked with the definition of a research question and the research methodology that was being applied. In the case of the Adelaide Living Laboratory project (Case A), it appears that where projects applied a positivist methodology to investigate a research question, the users were primarily treated as subjects.

This is not to suggest that there is a general link between positivist methodologies and the treatment of users and subjects. There are many examples of research based on these methodologies that do not treat users in this way. The concept of citizen-science for example, facilitates an engagement with users-as-partners, often with a positivist research methodology (Bonney et al. 2009; Irwin 2002; Silvertown 2009).[54] This suggests that perhaps the reason the Adelaide Living Laboratory projects adopted a user-as-subject model may be the conception of users as variables within the systems that were being studied.

Case B and Case C can be interpreted for the most part as treating the user as a partner but there were instances where the hierarchy of professional and user re-emerged. The co-creation methods used in both approaches focused on ways of engaging users as partners in the research process. This meant that the workshops focused on establishing a partnership between end-users and professional participants with care taken to ensure the workshop activities disarmed power dynamics where possible.

The workshop planning used the understanding of power discussed in section 5.4 (position multiplied by expertise) to establish activities that could level expertise-based power, significantly reducing (but not eliminating) the power differential between the participants. As well as reducing this power imbalance, the techniques used abstraction to allow participation in the activities regardless of design or architectural expertise. This approach was intended to promote a more equal partnership rather than subservience on either side. The ambition of these approaches was to facilitate end-user engagement while also maintaining the professional responsibility for specific design details, addressing at least in part, the challenges raised in Schatz and Rogers (2016).

The primary difference between Case B and Case C however, was in the feedback loop that carried information back into participants. In Case C, great attention was paid by the architects to documenting how user feedback and ideas were being incorporated (or not) into their design work. By contrast, the professional designer involved in Case B was not able to describe any clear links between user

[54] There are also examples, such as in the work of the Lab 4 Living where end-users or members of the community have been trained in the use of cultural probe techniques to help to collect research data (Chamberlain et al. 2011).

contributions and the designs that were presented. In this case, user contributions were recorded and reflected back to participants through workshop reports, but the disconnect between user-contributions and the professional design work meant that the experience of Case B can be interpreted as users being treated as subjects as well as partners. This also links the position of subject with the degrees of tokenism (informing, consultation, and placation) on Arnstein's Ladder (Arnstein 1969).

These experiences highlight the importance of professional designers translating user contributions into design work in co-creation processes. This begins to add nuance to the statement by the World Economic Forum (introduced in Chapter 2) that

> For the cities of tomorrow, collaboration as well as co-design and co-creation are the new 'must have' competences (World Economic Forum 2017).

Having witnessed the maintenance of the power differential between professional and end-user participants in Case B, the researcher expected the hierarchy between professional and end-user participants to be equally, if not more, pronounced in Case C because of the higher level of complexity involved in designing a building of such scale. However, the relationship in Case C displayed more elements of a partnership than in Case B. As the Value Network Analysis process later confirmed, the architects in Case C treated the contribution of end-users as being of tremendous importance and value.

The difference between the experiences of Case B and Case C may be attributed to a natural variation in the attitude of the individual designers involved. However, there may be a number of other explanations for this that will be explored in the next two sub-sections.

Complexity and user-engagement

In Chapter 4 Sennett (2012) was used to draw a distinction between a dialogic and a dialectic model of co-creation with the former focusing on process and the latter on outcomes. This was then developed in Chapter 5 to suggest that a dialogic model allows users to make a greater contribution to processes without devaluing professional expertise in decision making. Through the concept of Critical Pragmatism (Forester 2013) it was argued that dialogic engagement processes could give professionals better information from which to make decisions.

The experience of working with professional designers in the two cases, a town planner in Case B and a number of architects in Case C, highlighted a significant difference in the way they approached the information generated by end-users. As well as describing individual variation between professionals, this difference can also be examined through the tools that were used to plan and execute the respective processes.

A number of the activities in Case B asked participants to provide specific design advice, while in Case C, participants were asked to develop information and resources that the design team could interpret to create a design that would better serve their needs. This is a subtle distinction but can be used to suggest that the difference in the way users are treated may be at least partially related to whether the process is conceived and delivered as a dialogic or dialectic process, i.e. whether users are contributing to the process or the outcome.

There are close links here with the discussion on the measurement of participation in section 5.7. Case B can be seen as exemplifying an approach that is based on the IAP2 spectrum with the level of engagement defined through the ability of end-users to participate in decision making processes (International Association for Public Participation 2014). Case C by contrast focused on defining participation through the contribution that could be made to the project rather than an impact on the decision-making process. This is more in line with the approach typified by Critical Pragmatism or by Arnstein's Ladder because it allows for the documentation (and therefore measurement) of process (Arnstein 1969; Forester 2013).

The focus in Case B on designing a process where users could participate at the upper end of the IAP2 spectrum may be seen as having created a process where the contributions were less useful to the professional designer involved. By contrast, the way the co-creation process in Case C was envisaged might be classified as a lower level on the IAP2 spectrum, but was able to deliver outcomes that were perhaps more useful to the professional designers.

In Case C, the process of gathering information through a conversation with end-users rather than designing in real-time with end users may not appear to align with the ambitions of a co-creation process (as defined in Chapter 4); however, because the information gathered through these conversations was specifically

linked with the design outcomes, it can be interpreted as achieving a relatively high level (partnership) on Arnstein's Ladder (Arnstein 1969). Interestingly, upon reflection the processes used in Case C also resemble Alexander's (1979) pattern language approach that was described in section 5.5.

Perhaps another reason for the difference in the two cases may be traced to the information that was required by the professional designers. In Case B, the design task was relatively simple, and the focus of the co-creation process was on engaging with the community to build interest and ownership, rather than collaboratively solving a design challenge. In Case C, the design task was highly complex, and the focus of the co-creation process was therefore on extracting tacit knowledge from the future users of the building about the complex demands that might be placed on the space.

In Case B therefore, user contributions could be seen as being superfluous to the information required to design a community garden while in Case C, user contributions were a critical part of understanding the complex spatial requirements of the organisation. The need to access information could then be argued to have catalysed the shift from being about deciding which (if any) users should be listened to, to how best to get the information the designers required.

Reflecting again on the World Economic Forum's statement above (World Economic Forum 2017), if increasing complexity is linked with 'better' co-creation processes, the notion that collaboration, co-creation and co-design are becoming increasingly important skills for those creating the cities of tomorrow begins to become clearer. If the cities of tomorrow are needing to deal with Wicked Problems or indeed Super Wicked Problems as discussed in Chapter 2, the information required to address or solve the challenges that will be presented is by definition not held by a single individual, entity, or indeed discipline (Levin et al. 2012; Rittel & Webber 1973).

Vocational and personal end-user engagement

In section 10.1.1, the living laboratory role definitions proposed by Nyström et al. (2014) were used to distinguish between the various participant groups in Case C. This led to the establishment of a difference between end-users that had a specific responsibility as a part of the construction project and those that were involved because they could represent the views of their clients as well as being future

occupants of the building themselves. When examining the role of end-users in the co-creation process across the three cases however, a difference between end-users that were participating as a part of their vocation and those that were participating for personal interest begins to emerge.

The difference becomes particularly visible when exploring the principle of social learning through the framework of Social Practice Theory (Rodela 2011; Shove, Pantzar & Watson 2012). In Case B, end-user participants can be seen as experiencing both cognitive enhancement and moral development through social learning (Rodela 2011). This can be translated to the development of both skills and meanings in social practice parlance (Shove, Pantzar & Watson 2012). It was expected that in Case C, participants would experience cognitive enhancement and moral development, or the development of skills and meanings, in the same way; however, this did not appear to happen.

Using a phenomenological lens to explore the differences in these two cases, it can be suggested that this may have occurred as a result of a difference between end-users that participated as citizens or for personal reasons, and end-user participation as a part of their vocation. As an example, when end-user participants from the two cases were asked to reflect on how they understood 'sustainability', the responses in Case B focused largely on their personal understanding of sustainability and how it impacted their lives. By contrast, almost all of the end-user participants in Case C described the organisation's zero carbon certification and the organisation's approach to sustainability. It took a number of further questions to shift these participants away from considering this question only as a representative of their organisation.

When acting as an end-user vocationally, as in Case C, individuals appeared to be less willing to critically engage with questions relating to the meanings dimension of social practice. Instead, these values appeared to be considered outside of the individuals' control and determined by the leadership group of their organisation. While the meanings dimension of social practice is related specifically to communally-held rather than individually-held beliefs, many of the end-user participants in Case C appeared to consider these as non-negotiable fixed values that were decided upon by others. In Case B by contrast, participants were more willing to critically engage with their own assumptions and beliefs, perhaps demonstrating a more critical engagement with the meanings dimension.

There was also an interesting split between these two types of end-user with regard to the skills dimension of social practice. In Case C, participants appeared to place value only on the skills required to perform their professional role. Little interest was shown in developing skills in design and co-creation, nor in developing a higher-level understanding of carbon reduction strategies. Participants in Case B by contrast engaged keenly with the development of skills and knowledge, suggesting perhaps that higher value was being placed on these dimensions as outcomes. This difference may present opportunities to add further nuance to research into end-user motivations for participating in living laboratories (such as Logghe, Oelbrandt and Schuurman 2014 introduced in section 5.8).

One might hypothesise that participation as a citizen or as part of their vocation affected their level of empowerment to challenge their views and develop new skills. In particular, it may be useful to investigate whether vocational end-users felt as though they should not be engaging in the development of skills or knowledge that might be seen as surplus to their professional requirements during 'work' time. Those giving up their personal time by contrast may be more interested in furthering their skills and knowledge.

The assertion that there may be a difference between end-users that participate in a co-creation process as a part of their vocation and those that participate out of personal interest is based on the interpretation of a small sample, but presents an interesting opportunity for further research. This research may be particularly relevant when considering the application of co-creation more broadly in urban environments in contrast to product or service-focused living laboratories, there may be less clearly defined boundaries between those who use a space as a part of their vocation and those that use a space as a part of their personal life. Interestingly, this investigation would also in some ways return full-circle to the roots of co-creation and the participatory design processes discussed in Chapter 4.

Proxy user involvement

The concept of proxy-representation was introduced in Chapter 5. Although this approach is assumed to have resulted in similar inputs into the design process as direct end-user engagement, the Value Network Analysis suggests that much of the value of the co-creation process would be received by the proxy representatives rather than the communities that they were representing. The value for these communities is therefore reliant on a third expression of value that was

only briefly discussed in 10.3. This value is the translation by the architects of the inputs given by the proxy representatives into better design decisions that then create a better outcome for future users of the building and the services it contains.

This is not immediately problematic, but if applying this logic to Case B where the designer did not appear to gain any insights into the community's needs or desires through the co-creation process, the value of the co-creation process is restricted to the social learning, skills development, and assumed personal forms of value created for those that participated. This suggests that where the co-creation process is being used as a community building or social learning tool, the number of people involved in the workshops becomes critical. By contrast, in cases where there are strong links between end-user input and changes in the design (such as in Case C), the broader communal benefits of the co-creation process can be linked with the quality of insights gained through the co-creation process rather than the number of people that participated.

This distinction is also captured in both Arnstein's Ladder and the IAP2 spectrum (Arnstein 1969; International Association for Public Participation 2014). Processes where there is little connection between citizen input and project outcomes are seen as 'wasting time' by Arnstein (1969) and as low-quality public engagement by the IAP2 (International Association for Public Participation 2014). While this is a legitimate and important criticism of such a process, these assessments do not capture opportunities for social learning or other forms of value that may be generated for participants despite the poor outcome.

Perhaps a better response to these experiences would be to focus on the development of the skills of professional designers in engaging in co-creation processes as advocated for by the World Economic Forum (2017). This approach would help in the realisation of benefits for the broader community through the provision of better information to inform design practices, while still creating opportunities for other more immediate forms of value including skills development and social learning to emerge.

The Value Network Analysis process used to investigate Case C was not used to suggest a monetary value that could be associated with the engagement process. Instead, the uncovering of misalignments in the understanding of the value being

generated through the co-creation process does suggest the question of value could be better understood by professional participants.

Much of the literature that deals with the value of the co-creation process, particularly in the context of living laboratories acknowledges the balance between intrinsic and extrinsic motivation and reward structures (Baccarne et al. 2013; Logghe, Oelbrandt & Schuurman 2014). The consideration of social learning as one form of value among many in Case C demonstrates a shift in focus and the researcher's understanding between Case B and Case C. In Case B, the processes of cognitive enhancement and moral development associated with social learning were taken as the key form of value from the co-creation process (Rodela 2011). However, having observed the apparent disconnect between the experience of the end-user participants and that of the professional designer involved in this case, the researcher adjusted the focus of the final case to explore the value of the process from the perspective of the professional participants as well as end-users.

This shift is in line with the grounded theory methodology being used in this research (Glaser & Strauss 2017) and followed a similar path to a number of other studies of social learning where an initial focus on social learning is replaced by a broader evaluation of participatory processes (Rodela 2011). What is perhaps unique in the approach taken in this research is that the Value Network Analysis method was used to investigate the participatory process as well as, rather than instead of, social learning.

11.3.4 Leadership and ownership

The leadership and ownership dimension of the GUST definition of urban living laboratories is interesting to reflect upon through the cases in this research. As discussed in Chapter 3, leadership and ownership can be linked with building a strong and resilient community and were a key focus in Case B.

In case B this is evident in the gradual pulling-back of Renewal SA from the Parklands Community Garden steering committee. Here, community members, many of whom were a part of the three initial co-creation workshops, have taken on administrative roles and are now driving the direction of the garden together. Due to difficulties in accessing these participants for follow-up interviews, it is not possible to establish a connection between participation in the co-creation workshops and this sense of ownership. However, the importance of collaborative

processes in establishing these connections is described in previous findings from the literature, such as the R-Urban case summarised by Petrescu, Petcou and Baibarac (2016).

Leadership and ownership among end-user participants in the other two case studies is less visible. In both Case A and Case C, there is little evidence of either emerging. This is unsurprising in the context of the previous discussions around the treatment of users as subjects rather than partners in many projects in Case A, but is an unexpected result from Case C.

It was expected that the end-user participants in Case C would express a degree of ownership over the project because of their involvement in the co-creation process but this is yet to emerge. The Value Network Analysis in this case shows that involvement in the co-creation process led to a number of the employees feeling a stronger bond with the organisation; however, there was no expression of ownership over the outcomes of the construction project. This may be due to the immense complexity of the project, the long timeframe, and the small part that users felt they had in its realisation, or the fact that the users have not yet moved into the building. This ownership dimension may only be established through a follow-up study once the participants have moved into, and have begun to work from, their new building.

11.4 Conclusion

The discussion in this chapter has focused on drawing links between the three case studies presented in Chapters 7, 8, 9, and 10, and between the cases and the earlier chapters of this thesis. The chapter discussed the place of social research in efforts to reduce global GHG emissions, the conceptualisation of Multi-Level Perspective through Social Practice Theory and resilience, and used the GUST framework for urban living laboratories to explore how the cases contribute to knowledge about the application of co-creation in urban living laboratories.

The discussion began by exploring the notion of a role for social innovation in research to address the GHG emissions of urban environments. The experience of the cases demonstrated the importance of understanding the contribution of social innovation to GHG emission reduction beyond quantifiable or positivist models of data collection. The cases highlight the importance and difficulty associated with the behavioural component of greenhouse gas emission reduction and present the

framing of success as a critical part of the establishment of the urban living laboratory. Specifically, it was suggested that the narrow definition of success as reducing GHG emissions might in future be augmented with goals of improving resilience or enhancing community preparedness for the effects of climate change. The cases that have been presented suggest that goals such as these may enable and indeed encourage more socially-focused research.

The chapter then discussed the cases in terms of Multi-Level Perspective and Social Practice Theory. This discussion explored the opportunities for, and role of, the urban living laboratory in driving large scale sociotechnical change. It was shown that there is not a definitive way in which urban living laboratories can contribute to this question, and instead that within urban living laboratories there are opportunities to catalyse change in a number of different ways. The cases demonstrate how niche-level action can be used to inform the establishment of policies and processes at the regime scale, and how regime-scale action can be used to catalyse change at both the niche-scale and influence the direction of landscape-scale assemblages of social practices (sociotechnical systems).

The discussion of the cases in this chapter demonstrates how urban living laboratory research is not restricted to focusing on the development of the materials component of social practice. Instead, the cases show that the development of skills and meanings can take place while utilising existing materials.

The discussion of the cases through the GUST framework reinforces the rich variety of approaches that are possible within the concept of the urban living laboratory. The relatively narrow range of approaches to geographic embeddedness is unsurprising given this is one of the critical factors that distinguish the urban living laboratory from the living laboratory; but, the variety of approaches seen in the other dimensions show that the urban living laboratory concept has the potential to be applied to a rich variety of project-types and approaches.

Chapter 12 Conclusion and contributions

This chapter presents a brief overview of the arguments in this thesis, before highlighting some of the specific themes that have emerged in the research. It presents four key areas in which contributions have been made: in the definition of co-creation processes.

12.1 Thesis summary

This thesis reflects a shift in the focus of research about the greenhouse gas emissions of the built environment from technological research to research about sociotechnical systems (Manzini & Tassinari 2013; Shove 2010). It has discussed the importance of social innovation in addressing Wicked Problems and Super Wicked Problems (Levin et al. 2012; Rittel & Webber 1973), connecting these approaches with the methodologies being developed and used in living laboratory research. It has also highlighted the impact of the distinction between technically-oriented and socially-oriented living laboratory projects, and suggested that both the methodological approaches and evaluative frameworks being brought into living laboratories by both researchers and funding bodies are of critical importance in determining the model of living laboratory that emerges.

The arguments have highlighted the importance of understanding behaviour change through system-based rather than individual-based models. In particular, this thesis has used social practice to link behaviour change approaches with

theories of resilience and Multi-Level Perspective (Geels 2002; Laboy & Fannon 2016; Stevenson, Baborska-Narozny & Chatterton 2016; Vale 2014; Walker et al. 2004). This approach has enabled a conception of change that focuses on the connection between micro and macro scale practices, highlighting the way that contributory elements of practice can sit across multiple scales. It also highlights the complexity of change by describing Geels' (2002) levels (niche, regime and landscape) through the resilience of assemblages of practices rather than scale.

Although highlighting the importance of interdisciplinary and transdisciplinary professional collaboration in urban living laboratory projects, this thesis has focused primarily on the treatment of the user in living laboratories. This is largely due to the nature of the case study projects that were available for this research, but also reflects the central importance of the user in both living laboratory and urban living laboratory projects.

The challenge of differentiating between the user-as-subject and user-as-partner model of living laboratory has been discussed in a variety of ways in this thesis. This includes through the tension between a positivist scientific paradigm and a social science paradigm and the discussion on dialectic and dialogic collaboration.

12.2 Key themes

The key themes that have been explored in this thesis are:

- The need to focus on process rather than outcomes when planning, carrying out, and evaluating co-creation processes
- The factors that drive the differentiation between a technically-oriented and a socially-oriented living laboratory
- The role of facilitation tools in reducing power differentials and connecting co-creation processes with value, and
- The opportunities presented by the application of Value Network Analysis to co-creation processes.

Process not outcomes

The notion that co-creation is about processes rather than outcomes emerged in a number of ways in the literature and has been examined in the case studies in this thesis.

In the discussion on co-creation, a distinction was drawn between a dialectic model of co-creation and a dialogic model of co-creation. The dialectic model of co-creation was argued to be outcome focused, exacerbating power differentials by placing significant attention on the decision-making process. This model was

linked primarily with the user-as-subject model of living laboratory and with evaluations based on the International Association of Public Participation's Spectrum of Public Participation (International Association for Public Participation 2014). By contrast, the dialogic model of co-creation has been argued to be more focused on process, and able to accommodate the presence of multiple truths and the development of multiple outcomes. Critically, this model of co-creation was linked in Chapter 5 with critical pragmatism (Forester 2013), defining success through the evaluation of process as well as outcomes. Using this model, it has been argued that the level of engagement can be defined by the quality of the process rather than specific influence over decision making processes. Arnstein's Ladder of Citizen Participation (Arnstein 1969) has been shown to be somewhat applicable to the evaluation of these processes, particularly at lower levels. At higher levels however, the Ladder has been shown to focus only on the impact on decision making, making its recommendation as an evaluative framework difficult. The adaptation of existing frameworks, particularly in light of the findings of the Value Network Analysis presented in Chapter 9, is beyond the scope of this thesis but has been highlighted as an important element of future work in this area.

The importance of process also became clear in Chapter 8 and Chapter 10 (Cases B and C). In, Chapter 8 co-creation was linked with significant social learning, while in Chapter 10, it was linked with the generation of significant value that was not related to the outcomes. The case study experiences confirm the importance of process described in both the living laboratory and co-creation literature. They also suggest however, that there may be significant benefit in shifting the focus of 'community consultation' (as described in Chapter 5) from measurement that is defined through outcomes, onto measurements that can also capture elements of process.

The link between involvement in decision making processes and the quality of public consultation that is established by the IAP2 Spectrum (described in section 5.7), makes such a shift difficult. In Case B, the Spectrum would be unable to capture the social learning and community building processes that took place. In Case C, the Spectrum similarly would not capture the many nuanced value exchanges that took place and would instead focus on the way in which decision-making power was largely removed from end-user groups. It should be noted however, that this thesis is not advocating for the abandonment of the IAP2

Spectrum as a measure of the quality of consultation. Instead, it is suggesting that it be updated to include the measurement of both processes and outcomes in line with Forester's (2013) theory of Critical Pragmatism.

Factors influencing the focus of living laboratories

The discussion on models of living laboratory from the literature (Chapter 3) focused on the way two key models were defined: a technically focused living laboratory that typically treats users as subjects, and a socially focused living laboratory that is more likely to treat users as partners. These models were traced to two different starting points. The technically-focused or user-as-subject laboratory model was linked with the MIT Place Lab experiments while the socially focused or user-as-partner model was linked with the establishment of the European Network of Living Laboratories (ENoLL).

The discussion did highlight a number of instances where laboratories appeared to be operating as technically focused laboratories despite their membership in ENoLL (Sauer 2013). In this discussion, the reasons for this were described in terms of the thematic focus of the living laboratory. The findings of Case A however, suggest that there may be other factors influencing the direction of these living laboratories, particularly the research experience of the leadership of the living laboratory.

Case A highlighted the way in which both the ambition and execution of the Adelaide Living Laboratory shifted over time to focus increasingly on technical projects with research methodologies rooted in the physical sciences. What was particularly interesting to observe in this case was that the determining factor of the model of living laboratory was not necessarily related to the planning, ambition and establishment of the living laboratory; instead, it was related to the methodological expertise, skills, and previous experience of those involved in the execution of the living laboratory. Therefore, the shift was linked with changes in the personnel involved in the project over time as well as the impact of pre-existing research projects being incorporated under the banner of the living laboratory.

These phenomena were also reflected, although to a smaller degree, in Case C. Here, the impact of the previous experience of those involved guided the tools and techniques used in the co-creation process, demonstrating the impact of the inertia

developed in the industry through the sunk-cost of investing in methods of 'doing consultation'. As an example, the treatment by some involved in Case C of users as subjects that needed to be consulted rather than partners in the development process demonstrates the need for better understanding of how to work with users in co-creation projects in the built environment.

This suggests further research may be undertaken to explain the approaches taken by various living laboratories within the ENoLL network. This may help to explain Sauer's (2013) observation that many laboratories within the ENoLL network appear to only partially satisfy ENoLL's definition of the living laboratory, and may also help explain Frediani's (2016) assertion that although claiming to be collaborative and understand the value of the user, the design industry rarely works in these ways.

The importance of tools in mitigating power in the urban living laboratory

The power dynamics that were documented in Case B and Case C relate strongly to the observations in the literature about the ways in which power is established and manifested. In particular, the importance of positional power in multiplying the impact of personal or skills-based power was evident in both of these cases. What was also visible in these cases however, was the important role that collaboration and co-creation tools played in mitigating these power dynamics.

This is discussed to some degree in various toolkits (Brause 2016; Center for Active Design 2015; IDEO 2011), but the findings of the cases in this thesis suggest this is an area for further research and investigation. In particular, the findings of Case C suggest it would be useful to further explore the nexus between tools that flatten power differentials and those that are linked with the kinds of value and contribution being sought by those facilitating these processes. Ideally, these tools would come together to not only deliver a good dialogic process, but also to lead to good outcomes. This is closely linked with Critical Pragmatism, and may help build the toolkit of the moderator, mediator and facilitator described by Forester (2013).

Value Network Analysis as a method for understanding collaboration

A significant contribution has been made to the living laboratory and co-creation literature by this thesis through the demonstration of how an augmented version of the Value Network Analysis process (Allee & Schwab 2011) can be used to

evaluate the value of co-creation processes. The multi-perspectival approach in particular may be useful in describing processes where there are differing understandings of the intangible value being transferred between participants as seen in Case C. Further development of this method may provide opportunities to understand how intangible value is being exchanged in broader and more complex networks. This might include the perception of intangible value exchanges between professional consultants in complex construction projects.

There is also an opportunity to explore how the value being produced by and exchanged within the network might be translated into an economic understanding of value. It is in this assertion that a key argument of this thesis sits, that co-creation might be seen on a balance sheet as an asset rather than a liability. This may allow the research to challenge the dominant understanding of consultation (or co-creation) as being great in theory but too expensive in practice, expanding the opportunity to apply the co-creation methodology to projects that are not being supported by specific funding for co-creation. Once a decision has been made to apply co-creation on a project, the Value Network Analysis process may also present an opportunity to place value on the contributions made through alternate knowledge systems and to develop understandings of value that go beyond economic return on investment. Among the benefits of this approach that are envisioned is that this may assist in applying triple bottom line approaches to decision making and developing systems for ensuring a variety of stakeholders are receiving value.

12.3 Future directions

This thesis has identified a number of significant opportunities for future research in this area. The linking of theories of Social Practice, Resilience, and Multi-Level Perspective provides a framework to reassert the importance of sociotechnical approaches in tackling Wicked Problems.

For living laboratories, this thesis has highlighted the importance of distinguishing between different models of living laboratories, particularly between those that treat users as subjects and those that treat users as partners. By linking this with the suggestion of two models of co-creation (dialectic and dialogic), the research has provided a framework through which these distinctions can be further explored.

The need for further research into interdisciplinary and transdisciplinary professional collaborations within urban living laboratories has been highlighted, as has the need for new understandings of value that can capture the value of good processes as well as outcomes.

Finally, the additions to the published Value Network Analysis method offer opportunities for further development of this approach and show promise as sites for future research.

References

Ackoff, RL 1974, *Redesigning the future*, Wiley, New York, NY.

Agranoff, R & Radin, BA 1991, 'The comparative case study approach in public administration', *Research in public administration,* vol. 1, no. 1, pp. 203-31.

AirBnB 2018, *AirBnB Plus*, AirBnB, viewed 20 March, <www.airbnb.com/plus>.

Ajzen, I 1991, 'The theory of planned behavior', *Organizational behavior and human decision processes,* vol. 50, no. 2, pp. 179-211.

Albino, V, Berardi, U & Dangelico, RM 2015, 'Smart cities: Definitions, dimensions, performance, and initiatives', *Journal of urban technology,* vol. 22, no. 1, pp. 3-21.

Alcott, B, Giampietro, M, Mayumi, K & Polimeni, J 2012, *The Jevons paradox and the myth of resource efficiency improvements*, Routledge, London.

Alexander, C 1979, *The timeless way of building*, Oxford University Press, New York, NY.

Allee, V 2000, 'Reconfiguring the value network', *Journal of Business strategy,* vol. 21, no. 4, pp. 36-39.

Allee, V 2008, 'Value network analysis and value conversion of tangible and intangible assets', *Journal of Intellectual Capital,* vol. 9, no. 1, pp. 5-24.

Allee, V & Schwab, O 2011, *Value Networks and the true nature of collaboration*, ValueNet Works and Verna Allee Associates, Martinez, CA.

Amazon 2018, *Amazon Mechanical Turk: Access a global, on-demand, 24x7 workforce*, Amazon, viewed 5 September, <www.mturk.com>.

Anthopoulos, LG 2017, 'The Rise of the Smart City', *Understanding Smart Cities: A Tool for Smart Government or an Industrial Trick?*, Springer, New York, NY, pp. 5-45.

Aranda-Mena, G, Crawford, J, Chevez, A & Froese, T 2009, 'Building information modelling demystified: does it make business sense to adopt BIM?', *International Journal of managing projects in business,* vol. 2, no. 3, pp. 419-34.

Argyris, C & Schön, D 1978, *Organizational Learning*, Addison & Wesley, Reading, MA.

Arkes, HR & Blumer, C 1985, 'The psychology of sunk cost', *Organizational behavior and human decision processes,* vol. 35, no. 1, pp. 124-40.

Arnkil, R, Järvensivu, A, Koski, P & Piirainen, T 2010, *Exploring quadruple helix outlining user-oriented innovation models*, University of Tampere, Tampere, Finland.

Arnstein, SR 1969, 'A ladder of citizen participation', *Journal of the American Institute of planners,* vol. 35, no. 4, pp. 216-24.

Äyväri, A 2014, 'Towards a customer-centric tool for building value propositions', *Proceedings of the ENoLL OpenLivingLab Days*, ENoLL, pp. 39-50.

Babbie, ER 2016, *The practice of social research*, 16th Edition edn, Cengage Learning, Boston, MA.

Baccarne, B, Logghe, S, Veeckman, C & Schuurman, D 2013, 'Why collaborate in long-term innovation research? An exploration of user motivations in Living Labs', *EnoLL OpenLivingLab Summer School 2013*, ENoLL, pp. 49-51.

Bakhtin, MM 1981, *The dialogic imagination: Four essays by MM Bakhtin*, University of Texas Press, Austin, TX.

Ballon, P, Pierson, J & Delaere, S 2005, *Test and experimentation platforms for broadband innovation: Examining European practice*, Vrije University, Brussels, Belgium.

Ballon, P & Schuurman, D 2015a, 'Living labs: concepts, tools and cases'.

Ballon, P & Schuurman, D 2015b, 'Living labs: concepts, tools and cases', *info,* vol. 17, no. 4.

Ballon, P, Schuurman, D, Mastelic, J, Sahakian, M & Bonazzi, R 2015, 'How to keep a living lab alive?', *info,* vol. 17, no. 4, pp. 12-25.

Bardi, U 2011, 'The Seneca effect: why decline is faster than growth', *Cassandra's legacy (http://cassandralegacy. blogspot. com/2011/08/seneca-effect-origins-of-collapse. html,(Acceso 12/12/11)*.

Barroca, J, Brito, D, Campolargo, M, Concilio, G, Ferreira, V, Martires, P, Molinari, F, Oliveira, A, Oliveira, M, Petersen, SA, Couto, AS & Rizzo, F 2013, *My Neighbourhood Concept*, European Union ICT Policy Support Programme, Brussels, Belgium.

Bennett, A & Elman, C 2006, 'Qualitative research: Recent developments in case study methods', *Annu. Rev. Polit. Sci.,* vol. 9, pp. 455-76.

Berry, S, Davidson, K & Saman, W 2013, 'The impact of niche green developments in transforming the building sector: The case study of Lochiel Park', *Energy policy,* vol. 62, pp. 646-55.

Berry, S, Whaley, D, Davidson, K & Saman, W 2014a, 'Do the numbers stack up? Lessons from a zero carbon housing estate', *Journal of Renewable Energy,* vol. 67, pp. 80-89.

Berry, S, Whaley, D, Davidson, K & Saman, WJEP 2014b, 'Near zero energy homes–What do users think?', *Energy policy,* vol. 73, pp. 127-37.

Berry, S, Whaley, D, Saman, W & Davidson, K 2014c, 'Reaching to net zero energy: the recipe to create zero energy homes in warm temperate climates', *Energy Procedia,* vol. 62, pp. 112-22.

Berry, S & Davidson, K 2016, *Adelaide Living Laboratory Value Proposition: Householder*, Cooperative Research Centre for Low Carbon Living, Sydney, NSW.

Biddle, T, Bertoia, T, Greaves, S & Stopher, P 2006, 'The costs of infill versus greenfield development: A review of recent literature', *29th Australian Transport Research Forum*, pp. 1-15.

Binder, T, Brandt, E, Ehn, P & Halse, J 2015, 'Democratic design experiments: between parliament and laboratory', *CoDesign,* vol. 11, no. 3-4, pp. 152-65.

Blank, A 1999, 'Why do new meanings occur? A cognitive typology of the motivations for lexical semantic change', in A Blank & P Koch (eds), *Historical semantics and cognition*, Mouton de Gruyter, New York, NY, pp. 61-90.

Bonney, R, Cooper, CB, Dickinson, J, Kelling, S, Phillips, T, Rosenberg, KV & Shirk, J 2009, 'Citizen science: a developing tool for expanding science knowledge and scientific literacy', *BioScience,* vol. 59, no. 11, pp. 977-84.

Bornet, C & Brangier, E 2015, 'The effects of personas on creative codesign of work equipment: an exploratory study in a real setting', *CoDesign,* vol. 12, no. 4, pp. 1-14.

Botero, A & Hyysalo, S 2013, 'Ageing together: Steps towards evolutionary co-design in everyday practices', *CoDesign,* vol. 9, no. 1, pp. 37-54.

Bourdieu, P 1977, *Outline of a Theory of Practice*, Cambridge University Press, Cambridge, UK.

Boyatzis, RE 1998, *Transforming qualitative information: Thematic analysis and code development*, SAGE, Thousand Oaks, CA.

Brand, S 1987, *The Media Lab: Inventing the future at MIT*, Viking Penguin, New York, NY.

Braun, V & Clarke, V 2006, 'Using thematic analysis in psychology', *Qualitative research in psychology,* vol. 3, no. 2, pp. 77-101.

Brause, C 2016, *The Designer's Field Guide to Collaboration*, Routledge, London, UK.

Brown, T 2008, 'Design Thinking', *Harvard business review,* vol. 86, no. 6, pp. 84-92.

Brown, T & Wyatt, J 2010, 'Design thinking for social innovation', *Development Outreach,* vol. 12, no. 1, pp. 29-43.

Buchanan, R 1992, 'Wicked problems in design thinking', *Design issues,* vol. 8, no. 2, pp. 5-21.

Buchanan, R 2001, 'Design research and the new learning', *Design issues,* vol. 17, no. 4, pp. 3-23.

Bulkeley, H, Marvin, S, Palgan, YV, McCormick, K, Breitfuss-Loidl, M, Mai, L, von Wirth, T & Frantzeskaki, N 2018, 'Urban living laboratories: Conducting the experimental city?', *European Union and Regional Studies*, pp. 1-28.

Burck, B, Rüger, S, Frick, P, Williamson, A & Serikoff, G 2014, 'Facilitating a collaborative space', in K Muff (ed), *The Collaboratory*, Greenleaf Publishing, Sheffield, UK, pp. 47-57.

Burt, J & Purver, K 2014, 'Building information modelling for small-scale residential projects', *Proceedings of the Institution of Civil Engineers-Management, Procurement and Law,* vol. 167, no. 3, pp. 134-40.

Caragliu, A, Del Bo, C & Nijkamp, P 2011, 'Smart cities in Europe', *Journal of urban technology,* vol. 18, no. 2, pp. 65-82.

Center for Active Design 2015, *Building Healthy Places Toolkit*, Center for Active Design, Washington.

Çetiner, O 2010, 'A review of building information modeling tools from an architectural design perspective', in J Underwood & U Isikdag (eds), *Handbook of research on building information modeling and construction informatics: Concepts and technologies*, IGI Global, Hershey, PA, pp. 19-29.

Chathoth, P, Altinay, L, Harrington, RJ, Okumus, F & Chan, ES 2013, 'Co-production versus co-creation: A process based continuum in the hotel service context', *International Journal of Hospitality Management,* vol. 32, pp. 11-20.

Checkland, P 1981, 'Systems thinking, systems practice'.

Cialdini, R 1993, *The psychology of influence*, William Morrow & Co, New York, NY.

Clark, B & Foster, JB 2001, 'William Stanley Jevons and the coal question: An introduction to Jevons's "Of the Economy of Fuel"', *Organization & Environment,* vol. 14, no. 1, pp. 93-98.

Coleman, MD 2009, 'Sunk cost and commitment to dates arranged online', *Current Psychology,* vol. 28, no. 1, pp. 45-54.

Coleman, S & Von Hellermann, P 2011, *Multi-sited ethnography : problems and possibilities in the translocation of research methods*, Routledge, New York, NY.

Concilio, G, Deserti, A, Fedeli, V, Molinari, F, Marsh, J, Oliveira, A, Rizzo, F & Oliveira, M 2013, *Project Vision*, European Union ICT Policy Support Programme, Brussels, Belgium.

Concilio, G, Puerari, E & Rizzo, F 2013, *Living Labs Models for Co-Designing in Urban and Public Space*, European Union ICT Policy Support Programme, Brussels, Belgium.

Conn, S 2010, 'Back to the Garden: Communes, the Environment, and Antiurban Pastoralism at the End of the Sixties', *Journal of urban history,* vol. 36, no. 6, pp. 831-48.

Cooke, B & Kothari, U 2001, *Participation: The new tyranny?*, Zed Books, London, UK.

Coorevits, L, Schuurman, D & Herregodts, A-L 2013, 'Identifying Lead Users in a Living Lab Environment', *EnoLL OpenLivingLab Summer School 2013*, pp. 25-34.

Coorevits, L & Schuurman, D 2014, 'Comparing tools for hypothesis driven living labs', *Open Living Lab Days 2014*, European Network of Living Laboratories, pp. 7-25.

Corbin, J & Strauss, A 2008, 'Techniques and procedures for developing grounded theory', *Basics of qualitative research*, SAGE publications, Newbury Park, CA.

CORDIS 2008, *Corelabs*, European Commission, viewed 31 May 2018, <https://cordis.europa.eu/project/rcn/79424_en.html>.

Cottam, H & Leadbeater, C 2004, *RED paper 01: Health: Co-creating services*, Desgin Council, London, UK.

Cowan, N 2008, 'What are the differences between long-term, short-term, and working memory?', *Journal of Progresses in Brain Research,* vol. 169, pp. 323-38.

Crocker, R 2012, "Somebody Else's Problem': Consumer Culture, Waste and Behaviour Change-the Case of Walking', Earthscan.

Cross, N 1972, 'Design participation', *Proceedings of the Design Research Society's conference*, Academy Editions.

Crowther, P 1999, *Design for disassembly: an architectural strategy*, Queensland University of Technology, Brisbane, Australia.

Csikszentmihalyi, M 2014, 'Toward a psychology of optimal experience', *Flow and the foundations of positive psychology*, Springer, New York, NY, pp. 209-26.

Cunha, J, Marcus & Caldieraro, F 2009, 'Sunk-cost effects on purely behavioral investments', *Cognitive Science,* vol. 33, no. 1, pp. 105-13.

Davis, A, Crocker, R & Andrew, J 2016, *Co-Creation Toolkit: Status Report*, Cooperative Research Centre for Low Carbon Living, Sydney, Australia.

Davis, A 2017, 'Understanding the value generated by a co-creation approach to the built environment', *Architecture Connects*, Association of Architectural Education, pp. 4-15.

De Carli, B 2016, 'Micro-resilience and justice: co-producing narratives of change', *Building Research & Information,* vol. 44, no. 7, pp. 775-88.

Del Gaudio, C, Franzato, C & de Oliveira, AJJC 2018, 'Co-design for democratising and its risks for democracy', pp. 1-18.

Denscombe, M 2014, *The good research guide: for small-scale social research projects*, McGraw-Hill Education, New York, NY.

Department of Sustainability and Environment 2015, *Effective Engagement Toolkit*, Government of Victoria, Melbourne, Australia, viewed 16 February 2016, <http://www.dse.vic.gov.au/effective-engagement/toolkit>.

Derickson, KD & MacKinnon, D 2015, 'Toward an interim politics of resourcefulness for the Anthropocene', *Annals of the Association of American Geographers,* vol. 105, no. 2, pp. 304-12.

Dervojeda, K, Verzijl, D & Frinderes, F 2014, *Design for innovation: co-creation design as a new way of value creation*, European Commission, Brussels, Belgium.

Diederich, A, Swait, J & Wirsik, N 2012, 'Citizen participation in patient prioritization policy decisions: An empirical and experimental study on patients' characteristics', *PLoS One,* vol. 7, no. 5, p. e36824.

Durrett, C 2009, *The senior cohousing handbook: A community approach to independent living*, New Society Publishers, Gabriola Island, BA.

Dutilleul, B, Birrer, FA & Mensink, W 2010, 'Unpacking european living labs: analysing innovation's social dimensions', *Central European journal of public policy,* vol. 4, no. 1, pp. 60-85.

ENoLL 2014, *Activity Report 2013*, European Network of Living Laboratories, Brussels, Belgium.

ENoLL 2016, *About Us*, ENoLL, viewed 8 February, <www.openlivinglabs.eu/aboutus>.

ENoLL 2018, *Projects*, ENoLL, viewed 2 February, <www.enoll.org/projects/>.

ENoLL 2019, *What is ENoLL?*, ENoLL, Brussels, Belgium, viewed 15 May, <www.enoll.org/about-us/>.

Eriksson, M, Niitamo, V-P & Kulkki, S 2005, *State-of-the-art in utilizing Living Labs approach to user-centric ICT innovation-a European approach*, Center for Distance-spanning Technology, Lulea University of Technology, Lulea, Sweden.

European Commission 2009, *Design as a driver of user-centred innovation*, European Commission, Brussels.

Fagan-Watson, B & Burchell, K 2016, 'Heatwave planning: community involvement in co-producing resilience', *Building Research & Information,* vol. 44, no. 7, pp. 754-63.

Fairclough, N 2013, *Critical discourse analysis: The critical study of language*, Routledge, Abingdon-on-Thames, UK.

Feynman, RP 2010, *" Surely You're Joking, Mr. Feynman!": Adventures of a Curious Character: Adventures of a Curious Character*, WW Norton & Company, New York, NY.

Fleischer, DA 1991, 'The MIT Radiation Laboratory: RLE's Microwave Heritage', *RLE Currents,* vol. 4, no. 2, pp. 1-10.

Følstad, A 2008, 'Living labs for innovation and development of information and communication technology: a literature review', *The Electronic Journal for Virtual Organisations and Networks,* vol. 10, pp. 99-131.

Følstad, A, Brandtzæg, PB, Gulliksen, J, Börjeson, M & Näkki, P 2009, 'Towards a Manifesto for Living Lab Co-creation', in T Gross et al (eds), *Human-Computer Interaction – INTERACT*, Springer, Berlin, Heidelberg, pp. 979-80.

Forester, J, Susskind, L, Umemoto, K, Matsuura, M, Paba, G, Perrone, C & Mäntysalo, R 2011, 'Learning from practice in the face of conflict and integrating technical expertise with participatory planning: Critical commentaries on the practice of planner-architect Laurence Sherman mediation and collaboration in architecture and community planning: A profile of Larry Sherman practical elements of facilitative leadership and collaborative problem solving where do collaborative planning instincts come from? Lessons from the field words, bodies, things', *Planning Theory & Practice,* vol. 12, no. 2, pp. 287-310.

Forester, J 2013, 'On the theory and practice of critical pragmatism: Deliberative practice and creative negotiations', *Planning theory,* vol. 12, no. 1, pp. 5-22.

Foster, J 2003, *Class struggle and the industrial revolution: early industrial capitalism in three English towns*, Routledge, Abingdon-on-Thames, UK.

Foucault, M 1984, 'What is Enlightenment?', in P Rainbow (ed), *The Foucault Reader*, Pantheon Books, New York, NY, pp. 32-50.

Frankova, K & Woodcock, A 2013, 'In-situ methods as innovative approaches to effective co-creation of urban public spaces', *EnoLL OpenLivingLab Summer School 2013*, pp. 4-23.

Franz, Y 2014, 'Chances and challenges for Social Urban Living Labs in Urban Research ', *ENoLL OpenLivingLab Days 2014*, pp. 105-14.

Frediani, AA 2016, 'Re-imagining Participatory Design: Reflecting on the ASF-UK Change by Design Methodology', *Design issues,* vol. 32, no. 3, pp. 98-111.

Frissen, V & Van Lieshout, M 2004, *To user-centred innovation processes: the role of living labs*, TNO-ICT, Delft, Netherlands.

Fulford, R & Standing, C 2014, 'Construction industry productivity and the potential for collaborative practice', *International Journal of Project Management,* vol. 32, no. 2, pp. 315-26.

Füller, J, Hutter, K & Fries, M 2012, 'Crowdsourcing for goodness sake: impact of incentive preference on contribution behavior for social innovation', in KS Swan & S Zou (eds), *Interdisciplinary Approaches to Product Design, Innovation, & Branding in International Marketing*, Emerald Group Publishing Limited, Bingley, UK, pp. 137-59.

Fuller, RB, Agel, J & Clarke, AC 1970, *I Seem to Be a Verb: Environment and Man's Future*, Bantam Books, New York, NY.

Gatersleben, B & Vlek, C 1997, 'Understanding household metabolism in view of environmental quality and sustainable development', in G Antonides, WF van Raaij & S Maital (eds), *Advances in Economic Psychology*, John Wiley & Sons, Hoboken, NJ, pp. 145-68.

Gee, JP 2004, *An introduction to discourse analysis: Theory and method*, Routledge, Abington-on-Thames, UK.

Geels, FW 2002, 'Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study', *Research policy,* vol. 31, no. 8, pp. 1257-74.

Georges, A, Schuurman, D & Baccarne, B 2014, 'An exploratory model of the willingness of end-users to participate in field tests: A Living Lab case-study analysis', *Open Living Lab Days 2014*, European Network of Living Laboratories, pp. 185-93.

Giacomin, J 2014, 'What is human centred design?', *The Design Journal,* vol. 17, no. 4, pp. 606-23.

Giddens, A 1979, *Central problems in social theory: Action, structure, and contradiction in social analysis*, University of California Press, Berkeley, CA.

Giddens, A 1984, *The Constitution of Society*, Polity Press, Cambridge, UK.

Gladwell, M 2006, *The tipping point: How little things can make a big difference*, Little, Brown and Company, New York, NY.

Glaser, BG & Strauss, AL 2017, *Discovery of grounded theory: Strategies for qualitative research*, Routledge, Abingdon-on-Thames.

Gollagher, M, Petrova, S, Raphaely, T & Marinova, D 2015, *Collaborative urban planning for low carbon living in Australia: Interim Report*, CRC for Low Carbon Living, Sydney, Australia.

Google 2009, *Introducing: Google Wave*, Google, Cupertino, CA, viewed 30 October, <https://sites.google.com/a/pressatgoogle.com/googlewave/>.

Goulding, C 2005, 'Grounded theory, ethnography and phenomenology; A comparative analysis of three qualitative strategies for marketing research', *European Journal of Marketing,* vol. 39, no. 3/4, pp. 294-308.

Government of Australia 2019, *Cooperative Research Centres (CRC) Program*, viewed 17 April, <https://www.business.gov.au/assistance/cooperative-research-centres-programme>.

Government of South Australia 2016, *Principles of Engagement*, Government of South Australia, Adelaide, South Australia.

Government of South Australia 2017, *Engagement Level selection tool*, Government of South Australia, Adelaide, South Australia.

Graeber, D 2001, *Toward an anthropological theory of value: The false coin of our own dreams*, Palgrave Macmillan, Basingstoke, UK.

Gu, N & London, K 2010, 'Understanding and facilitating BIM adoption in the AEC industry', *Automation in Construction,* vol. 19, no. 8, pp. 988-99.

Habermas, J 1984, *The theory of communicative action*, Beacon press, Boston, MA.

Halliday, S 2001, 'Death and miasma in Victorian London: an obstinate belief', *BMJ: British Medical Journal,* vol. 323, no. 7327, p. 1469.

Hamel, J, Dufour, S & Fortin, D 1993, *Case study methods*, Sage, Thousand Oaks, CA.

Hardin, G 1968, 'The tragedy of the commons', *science,* vol. 162, no. 3859, pp. 1243-48.

Hargadon, A & Sutton, RI 1997, 'Technology brokering and innovation in a product development firm', *Administrative science quarterly,* vol. 42, no. 4, pp. 716-49.

Hartkopf, V, Loftness, V & Mill, P 1986, 'Integration for performance', in R Rush (ed), *The Building Systems Integration Handbook*, Butterworths-Heineman, Boston, MA.

Haukipuro, L, Heikkinen, T & Kivimäki, A 2013, 'Living labs for user-driven urban planning - empirical findings regarding new ways to engage citizens in the development process', *EnoLL OpenLivingLab Summer School 2013*, pp. 85-88.

Heikkinen, MT, Mainela, T, Still, J & Tähtinen, J 2007, 'Roles for managing in mobile service development nets', *Industrial Marketing Management,* vol. 36, no. 7, pp. 909-25.

Howaldt, J, Butzin, A, Domanski, D & Kaletka, C 2014, *Theoretical approaches to social innovation-a critical literature review. A deliverable of*

the project:'Social Innovation: Driving Force of Social Change'(SI-DRIVE), Sozialforschungsstelle, Dortmund, Germany.

Howe, J 2006, 'The rise of crowdsourcing', *Wired Magazine,* vol. 14, no. 6, pp. 1-4.

Howe, J 2008, *Crowdsourcing: How the power of the crowd is driving the future of business*, Random House,

Hubert, A 2010, *Empowering people, driving change: Social innovation in the European Union*, Bureau of European Policy Advisors, Brussels, Belgium.

Hyysalo, S & Hakkarainen, L 2014, 'What difference does a living lab make? Comparing two health technology innovation projects', *CoDesign,* vol. 10, no. 3-4, pp. 191-208.

IDEO 2011, *Human Centred Design Toolkit*, IDEO, San Francisco.

Ind, N & Coates, N 2013, 'The meanings of co-creation', *European Business Review,* vol. 25, no. 1, pp. 86-95.

Integrated Design Commission SA 2011, *Great ideas for a great city*, Integrated Design Commission SA, Adelaide, Australia.

International Association for Public Participation 2014, *IAP2's Public Participation Spectrum*, IAP2 International Federation, Woolongong, NSW.

International Association for Public Participation 2018, *About IAP2*, viewed 23 October, <https://www.iap2.org/page/A3>.

International Energy Agency 2012, *World Energy Outlook 2012*, International Energy Agency, Paris, France.

International Energy Agency 2016, *World Energy Outlook 2016*, International Energy Agency, Paris, France.

Intille, SS, Larson, K, Tapia, EM, Beaudin, JS, Kaushik, P, Nawyn, J & Rockinson, R 2006, 'Using a live-in laboratory for ubiquitous computing research', *International Conference on Pervasive Computing*, Springer, pp. 349-65.

IPCC 2014, *Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change*, IPCC, Geneva, Switzerland.

Irwin, A 2002, *Citizen science: A study of people, expertise and sustainable development*, Routledge, Abingdon-on-Thames, UK.

Jalas, M, Hyysalo, S, Heiskanen, E, Lovio, R, Nissinen, A, Mattinen, M, Rinkinen, J, Juntunen, JK, Tainio, P & Nissilä, H 2017, 'Everyday

experimentation in energy transition: A practice-theoretical view', *Journal of Cleaner Production,* vol. 169, pp. 77-84.

Janson, A, Corbusier, L, Krohn, C & Menges, A 2007, *Le Corbusier: Unité d'habitation, Marseille*, Edition Axel Menges, Fellbach, Germany.

Jensenius, AR 2012, 'Disciplinarities: intra, cross, multi, inter, trans', *Alexander Refsum Jensenius*, <http://www.arj.no/2012/03/12/disciplinarities-2/>.

Jevons, WS 1865, *The coal question: An inquiry concerning the progress of the nation, and the probable exhaustion of our coal-mines*, McMillan and Co, London.

Jobs, S 2005, "You've got to find what you love,' Jobs says', *Stanford News*, <https://news.stanford.edu/2005/06/14/jobs-061505/>.

Kim, W & Gandhi, J 2010, 'Coopting workers under dictatorship', *The Journal of Politics,* vol. 72, no. 3, pp. 646-58.

Knight, T 1749, *Refections Upon Catholicons, Or Universal Medicines*,

Kodiyalam, S & Sobieszczanski-Sobieski, J 2001, 'Multidisciplinary design optimisation-some formal methods, framework requirements, and application to vehicle design', *International Journal of Vehicle Design,* vol. 25, no. 1-2, pp. 3-22.

Komninos, N 2002, *Intelligent cities: innovation, knowledge systems and digital spaces*, Routledge, Abingdon-on-Thames, UK.

Kourtit, K, Nijkamp, P & Arribas, D 2012, 'Smart cities in perspective–a comparative European study by means of self-organizing maps', *Innovation: The European Journal of Social Science Research,* vol. 25, no. 2, pp. 229-46.

Krzywoszynska, A, Buckley, A, Birch, H, Watson, M, Chiles, P, Mawyin, J, Holmes, H & Gregson, N 2016, 'Co-producing energy futures: impacts of participatory modelling', *Building Research & Information,* vol. 44, no. 7, pp. 804-15.

Kumar, M, Singh, S, Ghate, AT, Pal, S & Wilson, SA 2016, 'Informal public transport modes in India: A case study of five city regions', *IATSS Research,* vol. 39, no. 2, pp. 102-09.

Laboy, M & Fannon, D 2016, 'Resilience theory and praxis: a critical framework for architecture', *ENQUIRY: The ARCC Journal,* vol. 13, no. 1, pp. 39-53.

Landsberger, HA 1958, *Hawthorne Revisited: Management and the Worker, Its Critics, and Developments in Human Relations in Industry*, ERIC, New York, NY.

Latane, B & Darley, JM 1970, 'Social determinants of bystander intervention in emergencies', *Altruism and helping behavior*, pp. 13-27.

Latour, B 2005, *Reassembling the Social-An Introduction to Actor-Network-Theory*, Oxford University Press, Oxford, UK.

Laws, D & Forester, J 2007, '34 Public Policy Mediation: From Argument to Collaboration', *Handbook of Public Policy Analysis*, p. 513.

Leminen, S, Habib, C & Westerlund, M 2015, 'Living Labs as Innovation Platforms: Key Constructs', *OpenLivingLab Days 2015*, European Network of Living Laboratories.

Levin, K, Cashore, B, Bernstein, S & Auld, G 2012, 'Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change', *Policy sciences,* vol. 45, no. 2, pp. 123-52.

Lijphart, A 1975, 'II. The comparable-cases strategy in comparative research', *Comparative political studies,* vol. 8, no. 2, pp. 158-77.

Local Government Association of South Australia 2016, *Community Engagement Framework*, Local Government Association of South Australia, Adelaide, South Australia.

Logghe, S, Oelbrandt, K & Schuurman, D 2014, 'Innovation is created by humans, not by systems. An exploration of user involvement in Living Labs: User motivation versus Lead User criteria', *ENoLL OpenLivingLab Days 2014*, ENoLL, pp. 94-104.

London, KA & Cadman, K 2009, 'Impact of a fragmented regulatory environment on sustainable urban development design management', *Architectural Engineering and Design Management,* vol. 5, no. 1-2, pp. 5-23.

Low Carbon Living CRC 2019, *Research*, viewed 16 April, <http://www.lowcarbonlivingcrc.com.au/research>.

Lozanovska, M & Xu, L 2013, 'Children and university architecture students working together: a pedagogical model of children's participation in architectural design', *CoDesign,* vol. 9, no. 4, pp. 209-29.

MacKinnon, D & Derickson, KD 2013, 'From resilience to resourcefulness: A critique of resilience policy and activism', *Progress in Human Geography,* vol. 37, no. 2, pp. 253-70.

Macquarie Library & Butler, S 2009, *Macquarie dictionary*, Macquarie Dictionary Publishers, Sydney, Australia.

Manrique, JD, Al-Hussein, M, Bouferguene, A & Nasseri, R 2015, 'Automated generation of shop drawings in residential construction', *Automation in Construction,* vol. 55, pp. 15-24.

Manzini, E 2006, 'Design, ethics and sustainability', *Guidelines for a Transition Phase*, CUMULUS Association, pp. 9-15.

Manzini, E 2007, 'The scenario of a multi-local society: creative communities, active networks and enabling solutions', *J Chapman & N Gant, Designers, visionaries and other stories, Earthscan, London, pp. 77â,* vol. 93.

Manzini, E 2010, 'Small, local, open and connected, Design for social innovation and sustainability', *The Journal of Design Strategies,* vol. 4, no. 1, pp. 8-11.

Manzini, E 2011, 'Design schools as agents of (sustainable) change: A Design Labs Network for an Open Design Program', *Researching Design Education: 1st International Symposium for Design Education Researchers*, CUMULUS Association, pp. 9-16.

Manzini, E & Rizzo, F 2011, 'Small projects/large changes: Participatory design as an open participated process', *CoDesign,* vol. 7, no. 3-4, pp. 199-215.

Manzini, E & Tassinari, V 2013, 'Sustainable qualities: Powerful drivers of social change', in R Crocker & S Lehmann (eds), *Motivating Change: Sustainable design and behaviour in the built environment*, Routledge, London, pp. 217-32.

Manzini, E & Coad, R 2015, *Design, when everybody designs: An introduction to design for social innovation*, MIT press, Boston, MA.

Marx, K 2014, *Capital: A Critique of Political Economy*, 4th edn, George Allen & Unwin Ltd., London, UK.

Mauss, M 2002, *The gift: The form and reason for exchange in archaic societies*, Routledge, Abingdon-on-Thames, UK.

McCamant, K & Durrett, C 2011, *Creating cohousing: Building sustainable communities*, New Society Publishers, Gabriola Island, Canada.

McCormick & Hartmann 2017, *The Emerging Landscape of Urban Living Labs: Characteristics, Practices and Examples*, Lund University, Lund, Sweden.

McGinley, T & Nakata, K 2012, 'A participatory design approach to the wicked problem of designing sustainable communities', *The Technologies for Sustainable Built Environments Engingeering and Design Conference*, University of Reading.

McGraw Hill Construction 2014, *The Business Value of BIM For Construction in Major Global Markets: how contractors around the world are driving innovation with building information modeling*, McGraw Hill, New York, NY.

Meadows, D, Meadows, D, Randers, J & Behrens, W 1972, *The limits to growth: A report for the Club of Rome's Project on the predicament of mankind*, The Club of Rome, Winterhur, Switzerland.

Meadows, DH 2008, *Thinking in systems: A primer*, Chelsea green publishing, White River Junction, VT.

Miessen, M 2010, *The nightmare of participation*, Sternberg Press, Berlin, Germany.

Milgram, S 1963, 'Behavioral study of obedience', *The Journal of abnormal and social psychology,* vol. 67, no. 4, p. 371.

Milliken, FJ, Bartel, CA & Kurtzberg, TR 2003, 'Diversity and creativity in work groups: A dynamic perspective on the affective and cognitive processes that link diversity and performance', *Group creativity: Innovation through collaboration*, pp. 32-62.

MIT Media Lab 2012, *Inventing the future at the MIT Media Lab*, MIT Media Lab, Boston, MA.

Mitchell, V, Ross, T, May, A, Sims, R & Parker, C 2015, 'Empirical investigation of the impact of using co-design methods when generating proposals for sustainable travel solutions', *CoDesign,* vol. 12, no. 4, pp. 1-16.

Moffatt, S & Kohler, N 2008, 'Conceptualizing the built environment as a social–ecological system', *Building Research & Information,* vol. 36, no. 3, pp. 248-68.

Moulaert, F 2013, *The international handbook on social innovation: collective action, social learning and transdisciplinary research*, Edward Elgar Publishing, Cheltnhamn, UK.

Mulder, I & Stappers, PJ 2009, 'Co-creating in practice: results and challenges', *IEEE International Technology Management Conference (ICE)*, IEEE, pp. 1-8.

Mulgan, G, Tucker, S, Ali, R & Sanders, B 2007, *Social innovation: what it is, why it matters and how it can be accelerated*, The Young Foundation, London, UK.

Munthe-Kaas, P & Hoffmann, B 2016, 'Democratic design experiments in urban planning–navigational practices and compositionist design', *CoDesign,* vol. 13, no. 4, pp. 1-15.

Murray, R, Caulier-Grice, J & Mulgan, G 2010, *The open book of social innovation*, National endowment for science, technology and the art, London, UK.

Nakamura, J & Csikszentmihalyi, M 2014, 'The concept of flow', *Flow and the foundations of positive psychology*, Springer, Berlin, Germany, pp. 239-63.

Nam, T & Pardo, TA 2011, 'Conceptualizing smart city with dimensions of technology, people, and institutions', *12th annual international digital government research conference: digital government innovation in challenging times*, ACM, pp. 282-91.

National Academy of Sciences 2005, *Facilitating interdisciplinary research*, National Academy of Sciences, Washington DC.

Neirotti, P, De Marco, A, Cagliano, AC, Mangano, G & Scorrano, F 2014, 'Current trends in Smart City initiatives: Some stylised facts', *Cities,* vol. 38, pp. 25-36.

Newton, P, Murray, S, Wakefield, R, Murphy, C, Khor, L & Morgan, T 2011, *Towards a new development model for housing regeneration in greyfield residential precincts*, Australian Housing and Urban Research Institute Limited, Melbourne, Australia.

Nicolini, DE 2012, *Practice theory, work, and organization: An introduction*, Oxford University Press, Oxford, UK.

Northouse, PG 2007, *Leadership: Theory and practice*, 4th Edition edn, Sage publications, Thousand Oaks, CA.

Nussbaumer, J & Moulaert, F 2007, *L'innovation sociale au coeur des débats publics et scientifiques*, Presses de l'Université du Québec, Quebec CIty, Canada.

Nyström, A-G, Leminen, S, Westerlund, M & Kortelainen, M 2014, 'Actor roles and role patterns influencing innovation in living labs', *Industrial Marketing Management,* vol. 43, no. 3, pp. 483-95.

Office of Design and Architecture South Australia 2014a, *Design Review Guidelines for Design Teams*, Government of South Australia, Adelaide, South Australia.

Office of Design and Architecture South Australia 2014b, *Design Review Panel Terms of Reference*, Government of South Australia, Adelaide, South Australia.

Oostra, M 2000, 'Project-related Development of Building Products as a Co-operative Process', *Collaborative Design*, Springer, Berlin, Germany, pp. 49-58.

Pascale, R, Sternin, J & Sternin, M 2010, *The power of positive deviance*, Harvard Business School Publishing, Boston, MA.

Payne, AF, Storbacka, K & Frow, P 2008, 'Managing the co-creation of value', *Journal of the academy of marketing science,* vol. 36, no. 1, pp. 83-96.

Penin, L 2013, 'Amplifying innovative sustainable urban behaviours: defining a design-led approach to social innovation', in S Lehmann & R Crocker (eds), *Motivating Change: Sustainable Design and Behaviour in the Built Environment*, Routledge, London, pp. 265-85.

Peterson, G 2003, 'Using ecological dynamics to move toward an adaptive architecture', *Construction Ecology*, Routledge, Abingdon-on-Thames, UK, pp. 151-74.

Petrescu, D, Petcou, C & Baibarac, C 2016, 'Co-producing commons-based resilience: lessons from R-Urban', *Building Research & Information,* vol. 44, no. 7, pp. 717-36.

Pickett, ST, Cadenasso, ML & Grove, JM 2004, 'Resilient cities: meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms', *Landscape and urban planning,* vol. 69, no. 4, pp. 369-84.

Pierson, J & Lievens, B 2005, 'Configuring living labs for a 'thick'understanding of innovation', *Ethnographic Praxis in Industry Conference*, Blackwell Publishing, pp. 114-27.

Plattner, H, Meinel, C & Leifer, L 2012, *Design Thinking Research: Studying Co-Creation in Practice*, Springer, Berlin, Germany.

Prochaska, JO & DiClemente, CC 1986, 'Toward a comprehensive model of change', *Treating addictive behaviors*, Springer, Berlin, Germany, pp. 3-27.

Prochaska, JO & Velicer, WF 1997, 'The transtheoretical model of health behavior change', *American Journal of Health Promotion,* vol. 12, no. 1, pp. 38-48.

Prosser, J & Schwartz, D 1998, 'Photographs within the sociological research process', in J Prosser (ed), *Image-based research: A sourcebook for qualitative researchers*, Falmer Press, London, UK, pp. 115-30.

Quinn, RE 1988, *Beyond rational management: Mastering the paradoxes and competing demands of high performance*, Wiley, New York, NY.

Reckwitz, A 2002, 'Toward a theory of social practices: A development in culturalist theorizing', *European journal of social theory,* vol. 5, no. 2, pp. 243-63.

Reed, M, Evely, AC, Cundill, G, Fazey, IRA, Glass, J, Laing, A, Newig, J, Parrish, B, Prell, C, Raymond, CJE & society 2010, 'What is social learning?', *Ecology and Society,* vol. 15, no. 4, pp. 1-10.

Rego, S, Arantes, J & Magalhães, P 2018, 'Is there a sunk cost effect in committed relationships?', *Current Psychology,* vol. 37, no. 3, pp. 508-19.

Rittel, HW & Webber, MM 1973, 'Dilemmas in a general theory of planning', *Policy sciences,* vol. 4, no. 2, pp. 155-69.

Robinson, J 1982, 'Energy backcasting A proposed method of policy analysis', *Energy policy,* vol. 10, no. 4, pp. 337-44.

Robinson, J 2003, 'Future subjunctive: backcasting as social learning', *Futures,* vol. 35, no. 8, pp. 839-56.

Robles, AG, Hirvikoski, T, Schuurman, D & Stokes, L 2015, 'Introducing ENoLL and its Living Lab community', *European Network of Living Labs, Brussels*.

Robles, AG, Hirvikoski, T, Schuurman, D & Stokes, L 2016, *Introducing ENoLL and its Living Lab community*.

Rodela, R 2011, 'Social learning and natural resource management: the emergence of three research perspectives', *Ecology and Society,* vol. 16, no. 4, pp. 1-18.

Rogelj, J, Den Elzen, M, Höhne, N, Fransen, T, Fekete, H, Winkler, H, Schaeffer, R, Sha, F, Riahi, K & Meinshausen, M 2016, 'Paris Agreement climate proposals need a boost to keep warming well below 2 C', *Nature,* vol. 534, no. 7609, p. 631.

Root-Bernstein, R 2003, 'The art of innovation: Polymaths and universality of the creative process', *The international handbook on innovation*, Elsevier, pp. 267-78.

Rosa, H 2003, 'Social acceleration: ethical and political consequences of a desynchronized high–speed society', *Constellations,* vol. 10, no. 1, pp. 3-33.

Rosa, H 2010, *High-speed society: social acceleration, power, and modernity*, Penn State Press, University Park, PA.

Rosa, H 2013, *Social acceleration: A new theory of modernity*, Columbia University Press, New York, New York.

Rubin, HJ & Rubin, IS 2011, *Qualitative interviewing: The art of hearing data*, Sage Publishing, Thousand Oaks, CA.

Saelens, BE & Handy, SL 2008, 'Built environment correlates of walking: a review', *Medicine and science in sports and exercise,* vol. 40, no. 7 Suppl, p. S550.

Salter, R & White, S 2013, *Collaborative research in the real world: review of living laboratories*, Cooperative Research Centre for Low Carbon Living, Sydney, Australia.

Sanders, E 2000, 'Generative tools for co-designing', *Collaborative design*, Springer, Berlin, Germany, pp. 3-12.

Sanders, E & Stappers, PJ 2008, 'Co-creation and the new landscapes of design', *Co-design,* vol. 4, no. 1, pp. 5-18.

Sanoff, H 1994, *School Design*, Wiley, New York, NY.

Sauer, S 2013, 'User innovativeness in Living Laboratories', University of Twente, Twente, Netherlands.

Schatz, L & Rogers, D 2016, 'Participatory, technocratic and neoliberal planning: an untenable planning governance ménage à trois', *Australian Planner,* vol. 53, no. 1, pp. 37-45.

Schatzki, TR & Schatzki, TR 1996, *Social practices: A Wittgensteinian approach to human activity and the social*, Cambridge University Press, Cambridge, UK.

Schön, D 1983, *The reflective practitioner*, Basic Books, New York, NY.

Schön, D 1987, *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*, Wiley, New York, NY.

Schuurman, D, Lievens, B, De Marez, L & Ballon, P 2012, 'Innovation from user experience in Living Labs: revisiting the 'innovation factory'-concept with a panel-based and user-centered approach', *Action for Innovation: Innovating from Experience (ISPIM XXIII-2012)*, Ghent University Department of Communication Studies.

Segelström, F, Raijmakers, B & Holmlid, S 2009, 'Thinking and doing ethnography in service design', *IASDR, Rigor and Relevance in Design.* , International Association of Societies of Design Research.

Sennett, R 2012, *Together: The rituals, pleasures and politics of cooperation*, Yale University Press, New Haven, CT.

Shaikh, PH, Nor, NBM, Nallagownden, P, Elamvazuthi, I & Ibrahim, T 2014, 'A review on optimized control systems for building energy and comfort management of smart sustainable buildings', *Renewable and Sustainable Energy Reviews,* vol. 34, pp. 409-29.

Sharifi, A 2016, 'From Garden City to Eco-urbanism: The quest for sustainable neighborhood development', *Sustainable Cities and Society,* vol. 20, pp. 1-16.

Shove, E 2010, 'Beyond the ABC: climate change policy and theories of social change', *Environment and planning A,* vol. 42, no. 6, pp. 1273-85.

Shove, E, Pantzar, M & Watson, M 2012, *The dynamics of social practice: Everyday life and how it changes*, Sage publications, Thousand Oaks, CA.

Silvertown, J 2009, 'A new dawn for citizen science', *Trends in ecology & evolution,* vol. 24, no. 9, pp. 467-71.

Simmel, G 2004, *The philosophy of money*, Routledge, Abingdon-on-Thames, UK.

Simpson, J & Weiner, E 1989, *Oxford English Dictionary*, Oxford University Press, Oxford, UK.

Singh, MM, Sawhney, A & Borrmann, A 2015, 'Modular coordination and BIM: development of rule based smart building components', *Procedia Engineering,* vol. 123, pp. 519-27.

Sommers, FG & Dineen, T 1984, *Curing nuclear madness*, Methuen, Toronto, Canada.

Spreitzer, GM & Sonenshein, S 2004, 'Toward the construct definition of positive deviance', *American behavioral scientist,* vol. 47, no. 6, pp. 828-47.

Stasser, G & Birchmeier, Z 2003, 'Group creativity and collective choice', *Group creativity: Innovation through collaboration*, pp. 85-109.

Steen, M 2011, 'Tensions in human-centred design', *CoDesign,* vol. 7, no. 1, pp. 45-60.

Stember, M 1991, 'Advancing the social sciences through the interdisciplinary enterprise', *The Social Science Journal,* vol. 28, no. 1, pp. 1-14.

Stevenson, F, Baborska-Narozny, M & Chatterton, P 2016, 'Resilience, redundancy and low-carbon living: co-producing individual and community learning', *Building Research & Information,* vol. 44, no. 7, pp. 789-803.

Stevenson, F & Petrescu, D 2016, *Co-producing neighbourhood resilience*, Taylor & Francis, Abingdon-on-Thames, UK.

Stock, P & Burton, RJ 2011, 'Defining terms for integrated (multi-inter-trans-disciplinary) sustainability research', *Sustainability,* vol. 3, no. 8, pp. 1090-113.

Stollmann, J 2016, 'Neighbourhood resilience in mass housing: co-production via research-by-design', *Building Research & Information,* vol. 44, no. 7, pp. 737-53.

Strauss, A & Corbin, JM 1990, *Basics of qualitative research: Grounded theory procedures and techniques*, Sage Publishing, Thousand Oaks, CA.

Succar, B & Kassem, M 2015, 'Macro-BIM adoption: Conceptual structures', *Automation in Construction,* vol. 57, pp. 64-79.

Sustainability Transitions Research Network 2018, *Sustainability Transitions Research Network*, viewed 3 November, <www.transitionsnetwork.org>.

Sutton, M 2017, *Uber drivers earning 'minimum wage', say South Australian drivers*, ABC News, Adelaide, viewed 12/2/18, <http://www.abc.net.au/news/2017-03-24/uber-drivers-earning-minimum-wage-as-partners-speak-out/8383682>.

Swyngedouw, E, Moulaert, F & Rodriguez, A 2002, 'Neoliberal urbanization in Europe: large–scale urban development projects and the new urban policy', *Antipode,* vol. 34, no. 3, pp. 542-77.

Szebeko, D & Tan, L 2010, 'Co-designing for Society', *Australasian Medical Journal,* vol. 3, no. 9, pp. 580-90.

Tan, L 2010, 'The different roles of the designer and their value', *Demonstrating the value of design (thinking)*, Billy Blue College of Design, Sydney, Australia, pp. 40-44.

Terjesen, S & Politis, D 2015, 'From the editors: In praise of multidisciplinary scholarship and the polymath', *Academy of Managmeent Learning & Education,* vol. 15, no. 2, pp. 151-57.

Thaler, RH, Sunstein, CR & Leonard, TC 2008, *Nudge: Improving decisions about health, wealth, and happiness*, Springer, Berlin, Germany.

Thite, M 2011, 'Smart cities: implications of urban planning for human resource development', *Human Resource Development International,* vol. 14, no. 5, pp. 623-31.

Timmins, G 2013, 'Housing industrial workers during the 19th century: back-to-back housing in textile Lancashire', *Industrial Archaeology Review,* vol. 35, no. 2, pp. 111-27.

Trubka, R, Newman, P & Bilsborough, D 2008, *Assessing the costs of alternative development paths in Australian cities*, Curtain University Sustainable Policy Institute, Freemantle, WA.

Turner, F 2010, *From counterculture to cyberculture: Stewart Brand, the Whole Earth Network, and the rise of digital utopianism*, University Of Chicago Press, Chigaco, IL.

UN Habitat 2011, *Cities and climate change: Global report on human settlements 2011*, Earthscan, London, UK.

United States Environmental Protection Agency 2009, *'Brownfields' in Resource Conservation and Recovery Act Program Glossary of Terms*, United States Environmental Protection Agency Region 8/Solid and Hazardous Waste Program, viewed 8 May,

<https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do>.

Uniting Comunities 2019a, *Home*, viewed 24 March, <https://www.unitingcommunities.org>.

Uniting Comunities 2019b, *About U City*, viewed 24 March, <https://www.ucity.com.au/about-u-city/>.

University of South Australia Research Node for Low Carbon Living 2019a, *Adelaide Living Laboratory*, viewed 19 February 2019, <http://www.unisa.edu.au/IT-Engineering-and-the-Environment/School-of-Engineering/Research/Research-Node-for-Low-Carbon-Living/Research-Projects/Adelaide-Living-Laboratory/>.

University of South Australia Research Node for Low Carbon Living 2019b, *Research Projects*, viewed 10 April, <http://www.unisa.edu.au/IT-Engineering-and-the-Environment/School-of-Engineering/Research/Research-Node-for-Low-Carbon-Living/Research-Projects/>.

URBACT 2018, *URBACT: Driving change for better cities*, European Union Regional Development Fund, Paris, France, viewed 5 December, <www.urbact.eu>.

Urban and Regional Planning Solutions 2014, *An Efficient and Effective Development Assessment Process for South Australia: Issues Paper*, Local Government Association of South Australia, Adelaide, South Australia.

Vale, LJ 2014, 'The politics of resilient cities: whose resilience and whose city?', *Building Research & Information,* vol. 42, no. 2, pp. 191-201.

Vanolo, A 2016, 'Is there anybody out there? The place and role of citizens in tomorrow's smart cities', *Futures,* vol. 82, pp. 26-36.

Vargo, SL & Lusch, RF 2004, 'Evolving to a new dominant logic for marketing', *Journal of marketing,* vol. 68, no. 1, pp. 1-17.

Visser, FS, Stappers, PJ, Van der Lugt, R & Sanders, EB 2005, 'Contextmapping: experiences from practice', *CoDesign,* vol. 1, no. 2, pp. 119-49.

Von Hippel, E 1976, 'The dominant role of users in the scientific instrument innovation process', *Research policy,* vol. 5, no. 3, pp. 212-39.

Von Hippel, E 1986, 'Lead users: a source of novel product concepts', *Management science,* vol. 32, no. 7, pp. 791-805.

Walker, B, Holling, CS, Carpenter, S & Kinzig, A 2004, 'Resilience, adaptability and transformability in social–ecological systems', *Ecology and Society,* vol. 9, no. 2, pp. 5-13.

Wasserman, S & Faust, K 1994, *Social network analysis: Methods and applications*, Cambridge university press,

Watson, G 1977, 'Skepticism about weakness of will', *The Philosophical Review,* vol. 86, no. 3, pp. 316-39.

Webler, T, Kastenholz, H & Renn, O 1995, 'Public participation in impact assessment: a social learning perspective', *Environmental impact assessment review,* vol. 15, no. 5, pp. 443-63.

Westerlund, M, Leminen, S & Habib, C 2018, 'Key Constructs and a Definition of Living Labs as Innovation Platforms', *Technology Innovation Management Review,* vol. 8, no. 12, pp. 51-62.

Whole Earth 2018, *Whole Earth Catalog*, Whole Earth, viewed 9 December, <http://www.wholeearth.com/history-whole-earth-catalog.php>.

Wiener, N, Jerison, D, Singer, IM & Stroock, DW 1997, *The Legacy of Norbert Wiener: A Centennial Symposium in Honor of the 100th Anniversary of Norbert Wiener's Birth, October 8-14, 1994, Massachusetts Institute of Technology, Cambridge, Massachusetts*, American Mathematical Society, Providence, RI.

Wolfram, M 2012, 'Deconstructing smart cities: an intertextual reading of concepts and practices for integrated urban and ICT development', *REAL CORP*, pp. 171-81.

World Economic Forum 2017, *Harnessing Public-Private Cooperation to Deliver the New Urban Agenda*, World Economic Forum, Geneva.

World Economic Forum 2018, *World Economic Forum*, World Economic Forum, Paris, viewed 14 May, <www.weforum.org>.

Yawson, RM 2009, 'The ecological system of innovation: A new architectural framework for a functional evidence-based platform for science and innovation policy', *The Future of Innovation Proceedings of the XXIV ISPIM 2009 Conference*, SSRN, pp. 1-16.

Yin, RK 2009, *Case study research: Design and Methods*, SAGE publications, Thousand oaks, CA.

York, R 2010, 'The paradox at the heart of modernity: The carbon efficiency of the global economy', *International Journal of Sociology,* vol. 40, no. 2, pp. 6-22.

Yukl, G 1989, 'Managerial leadership: A review of theory and research', *Journal of management,* vol. 15, no. 2, pp. 251-89.

Zeitlin, M 1991, 'Nutritional resilience in a hostile environment: positive deviance in child nutrition', *Nutrition Reviews,* vol. 49, no. 9, pp. 259-68.

Zygiaris, S 2013, 'Smart city reference model: Assisting planners to conceptualize the building of smart city innovation ecosystems', *Journal of the Knowledge Economy,* vol. 4, no. 2, pp. 217-31.

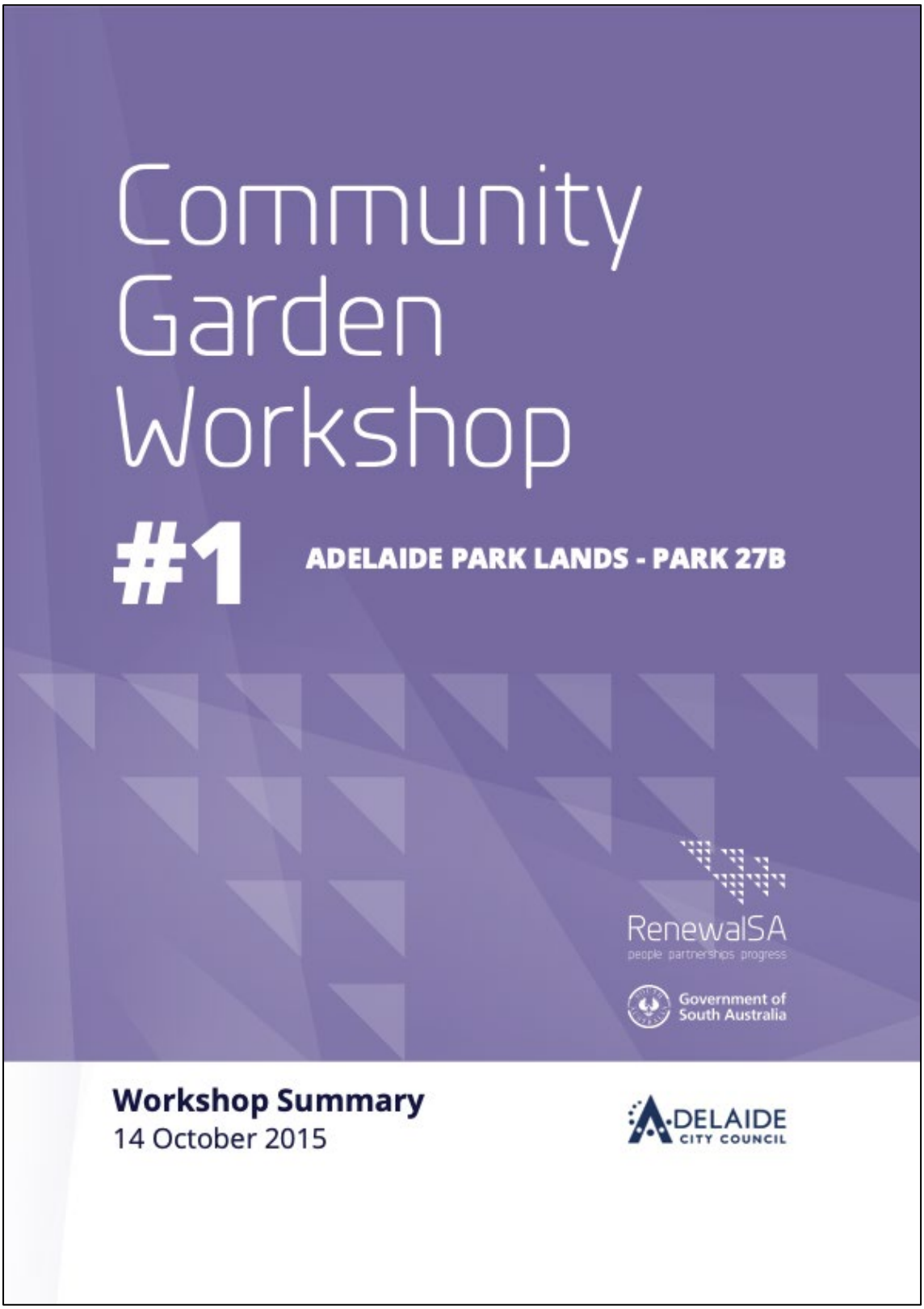
Appendix A: Case B: Parklands Community Garden workshop reports

Appendix A.1 Parklands Community Garden Workshop One (Vision) Report 307

Appendix A.2 Parklands Community Garden Workshop Two (Design) Report.....331

Appendix A.3 Parklands Community Garden Workshop Three (Rationalisation) Report 353

Appendix A.1: Parklands Community Garden Workshop One (Vision) Report



Thank you

Events like this cannot happen without the generous support of those who attend.

We had a great turn out and were very excited to have so many passionate people in the room.

For those people who weren't able to attend we are hopeful that this document may fill you in on some of the details of what was discussed and some of the ideas that started to emerge.


What we said
Site history
Parklands legislation
Environmental constraints
Significant and other trees
A staged approach
Live training site opportunity


1850s
Reserved as park lands but used as storage yard right through until the 1990s. Impacted by different uses over many years including as a wood yard.
1949
Road through site connected North Adelaide with north-western suburbs. The alignment of Park Terrace changed several times over many years.
1989
Park terrace overpass built across railway line, also impacting the site.
2012
Renewal SA undertook master planning including a section of the western Park Lands in 2011-12. As part of the Greater Park 27b Master Plan a community garden was included in the norther corner. Renewal SA consulted the community on site in Feb 2013 and there was a strong interest from many people in a community garden.
2015
Works to upgrade park 27B commenced with soccer club and sporting grounds facilities
First workshops run to set up and found the Bowden Community Garden



1949



1979



2012

Key points

After our introductory exercise we had a series of presentations from a number of people who are involved in this project to set the scene.

Park Lands legislation

- Park Land concept plan was approved by the Adelaide Park Lands Authority (APLA) and Adelaide City Council (ACC) in 2014.
- The community garden was included in the approved concept subject to:
  - the preparation of a detailed design, and
  - a management plan.
- Ongoing management of the garden will require the formation of an incorporated body with a committee (management group) and a license over the land with ACC.



Potential environmental constraints

- The site is typical of the Park Lands.
- It has imported fill material from unknown sources – including brick fragments, ash and cinders.
- The soil has a number of contaminants that will constrain its use as a garden.
- The soil is not suitable as a growing medium for most edible produce
- Uncertainty around past use of the site for storage
- An Environmental Management Plan (EMP) to guide the safe use of soil on the site will be prepared when the design of the garden is clearer.
- The Plan will provide information on:
  - The current contamination issues of the site
  - Precautions that need to be taken during the construction of the garden, and the precautions that need to be taken after construction and during its use.

Significant and other trees

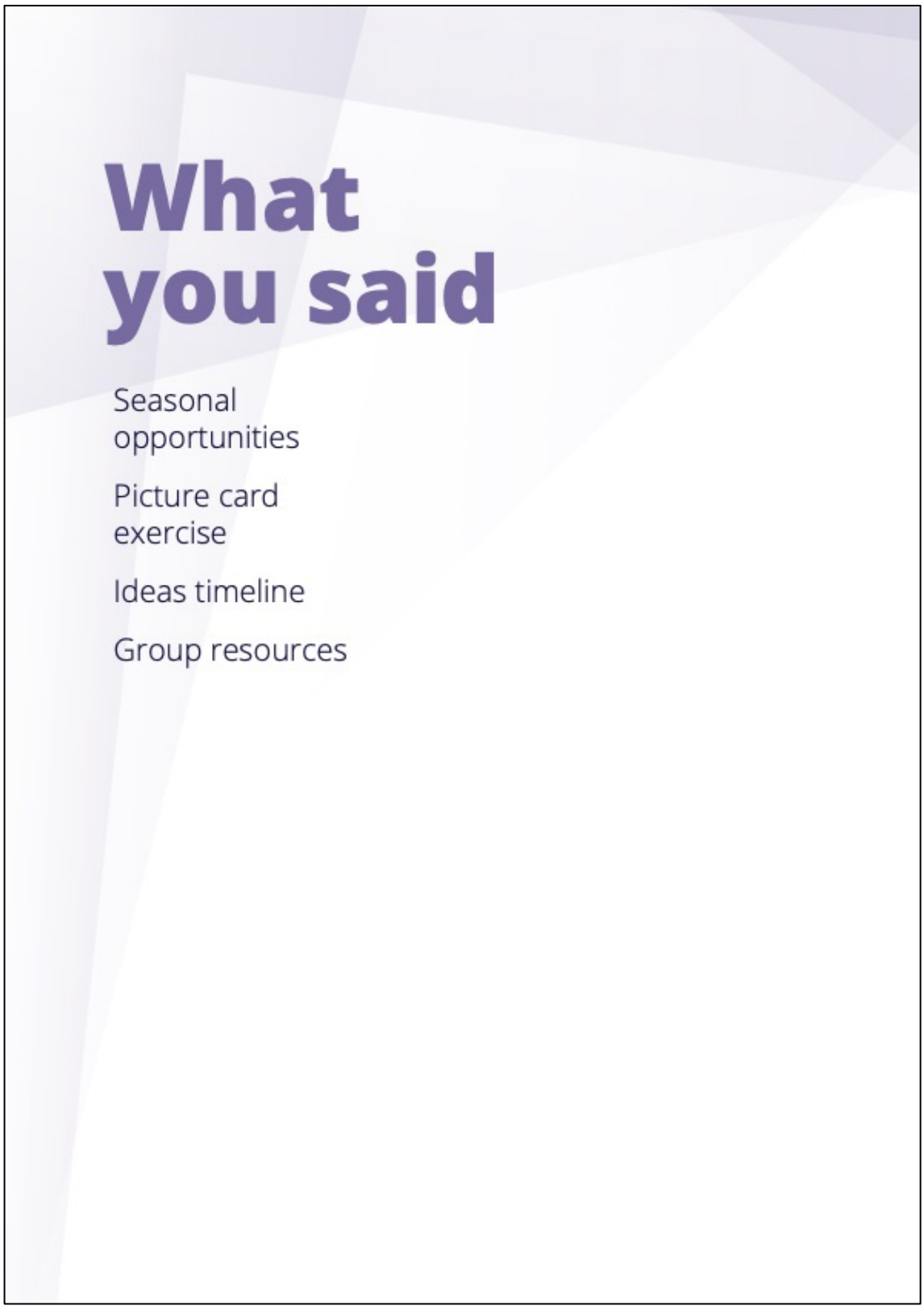
- A number of native and non-native trees have been planted on the site
- Two regulated trees exist – a River Red Gum and a Blue Gum – which should be retained
- Other trees need to be considered carefully. Some may impact on the success of growing a community garden; however, if gardening in raised beds, roots should not be an issue for shade tolerant plants. Sunny spots away from trees will also be available in parts of the garden.

A staged approach

- A staged approach to delivering the garden is likely – due to the time involved and funds available the garden may start with a small number of beds and could grow later when more funds become available and people's interest increases.
- The initial budget is $60,000.

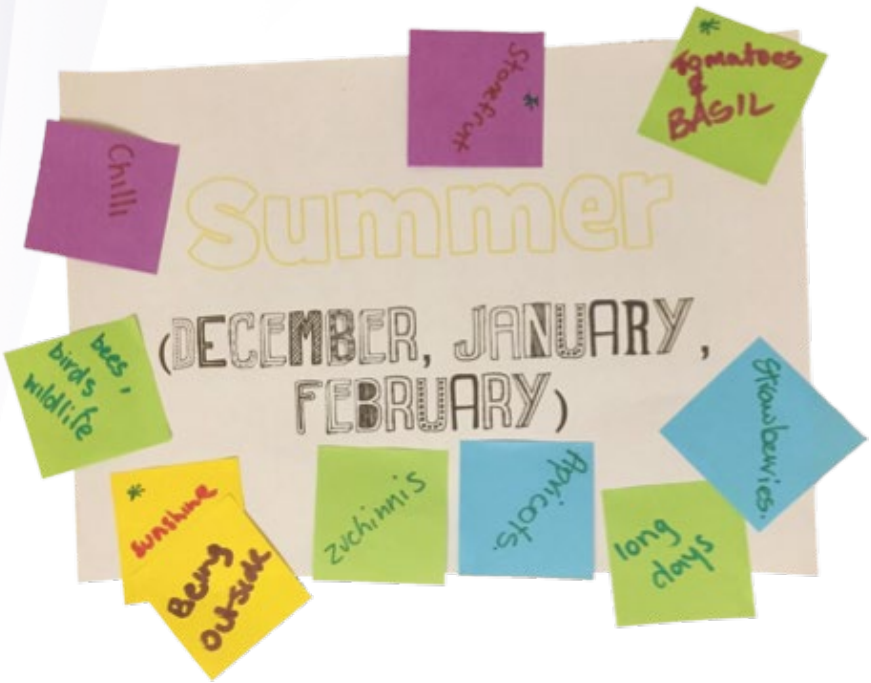
Live Training Site Opportunity

- As part of Renewal SA's training and employment program, a Live Training Site will be created to help disadvantaged, unemployed or those local community members looking for a new qualification.
- A registered training provider will guide the delivery of work by trainees.
- The work could include garden bed construction, paths, irrigation etc.- which will emerge from the design being done with the community through these workshops.


What you said
Seasonal opportunities
Picture card exercise
Ideas timeline
Group resources

Seasons

We asked you to identify what your favourite elements of each season were. As a group we discovered that in summer we enjoy eating fresh produce in the sunshine, in autumn we enjoy relaxing and enjoying the beautiful colours, in winter some slow paced pruning and having time to think and plan, and in spring we enjoy the abundance of fresh produce and flowers.




Autumn
(MARCH, APRIL, MAY)
Spring
(SEPTEMBER, OCTOBER, NOVEMBER)
FLOWERS
HAPPY
Winter
(JUNE, JULY, AUGUST)

Picture cards

We asked you to sort through a series of picture cards and pick your favourites and to start to identify what it was about the pictures that was appealing.

We had a lot of ideas coming out of this with some very poular themes starting to emerge.

The most popular themes were: community, raised garden beds, colour, and art.

















healthy growth. not

Community notice board



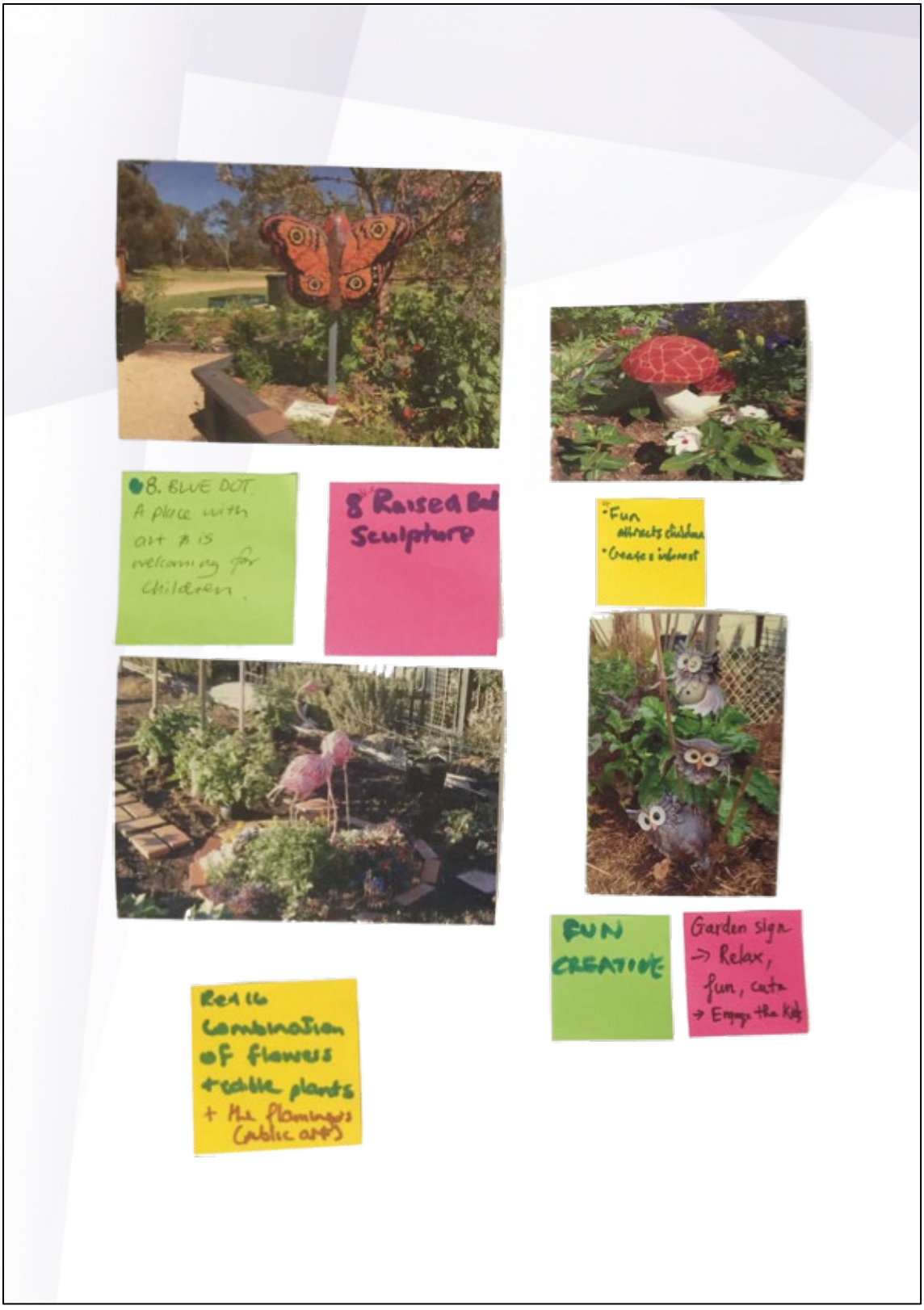


Raised Plot.



Productive · Raised beds

Raised garden - looking abundant.


8. BLUE DOT
A place with
art & is
welcoming for
children.
8 Raised Bed
Sculpture
*Fun
attracts children
*Creates interest
FUN
CREATIVE
Garden sign
-> Relax,
fun, cute
-> Engage the Kids
Red to
combination
of flowers
+edible plants
+ the flamingos
(public art)





Blue 1
Open Space
Composting

Great 20
Produce -
Vibrant
Colour.



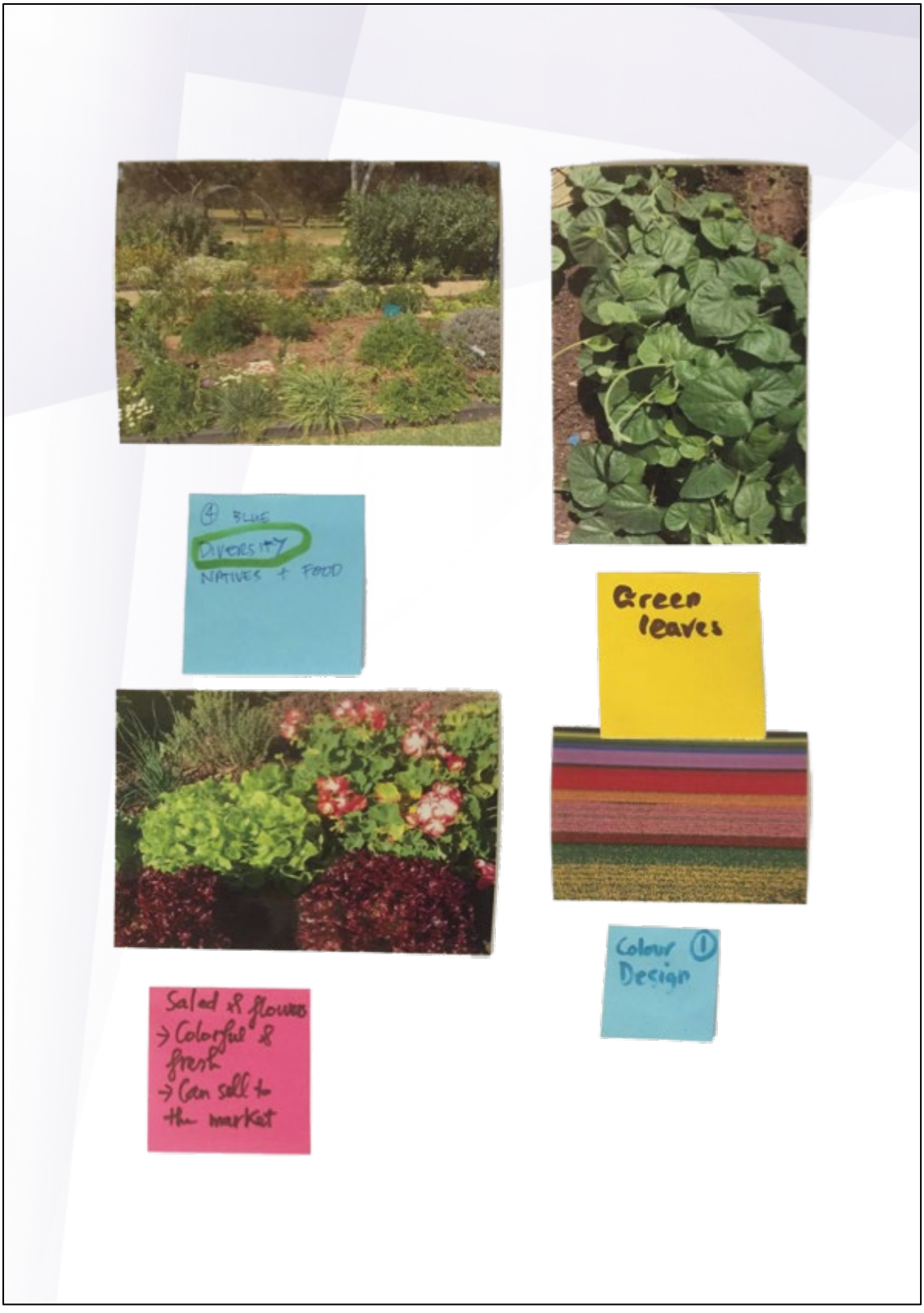


Natural open
setting
• Very productive
• Well cared for



Zen
"Peace"

Orange 18.
'Secret
Garden'
+
natural
Space.


④ BLUE
DIVERSITY
NATIVES + FOOD
Green leaves
Colour ①
Design
Salad & flowers
→ Colorful & fresh
→ Can sell to the market





Nurturing
CARING

IS RED
COMMUNITY
BUILDING
+ NEW
Tree Hts.





4. Orange.
Good if anyone
wants to grow
aesthetic plants
that they get a
plot to show off their

Flavour

Ideas timeline

We knew everyone would be coming along to the workshop with some amazing ideas and wanted to start to sort those ideas into themes and time frames so that they can help to inform our future workshops.

We asked for everything from your ideas for the next 12 months right through to what you wanted the garden to be in 50 years time. We asked you to vote for your most popular ideas and you came up with the following list:

Short term

- Raised garden beds & planting things (8 votes)
- Planting fruit trees (5 votes)
- Childrens play space and growing space (4 votes)

Medium term

- Heirloom fruits (3 votes)
- Community education workshops (3 votes)
- A wood-oven (3 votes)

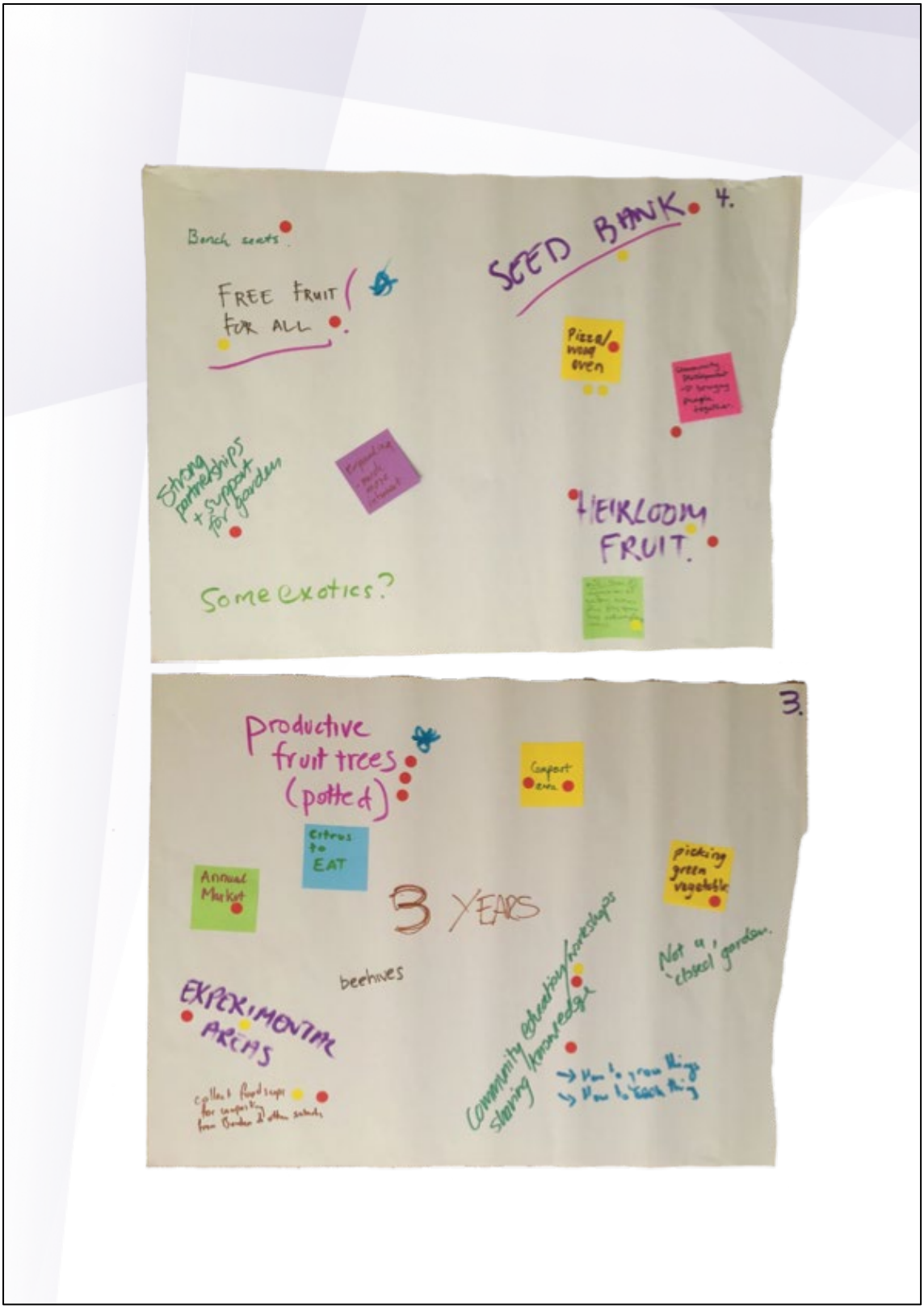
Long term

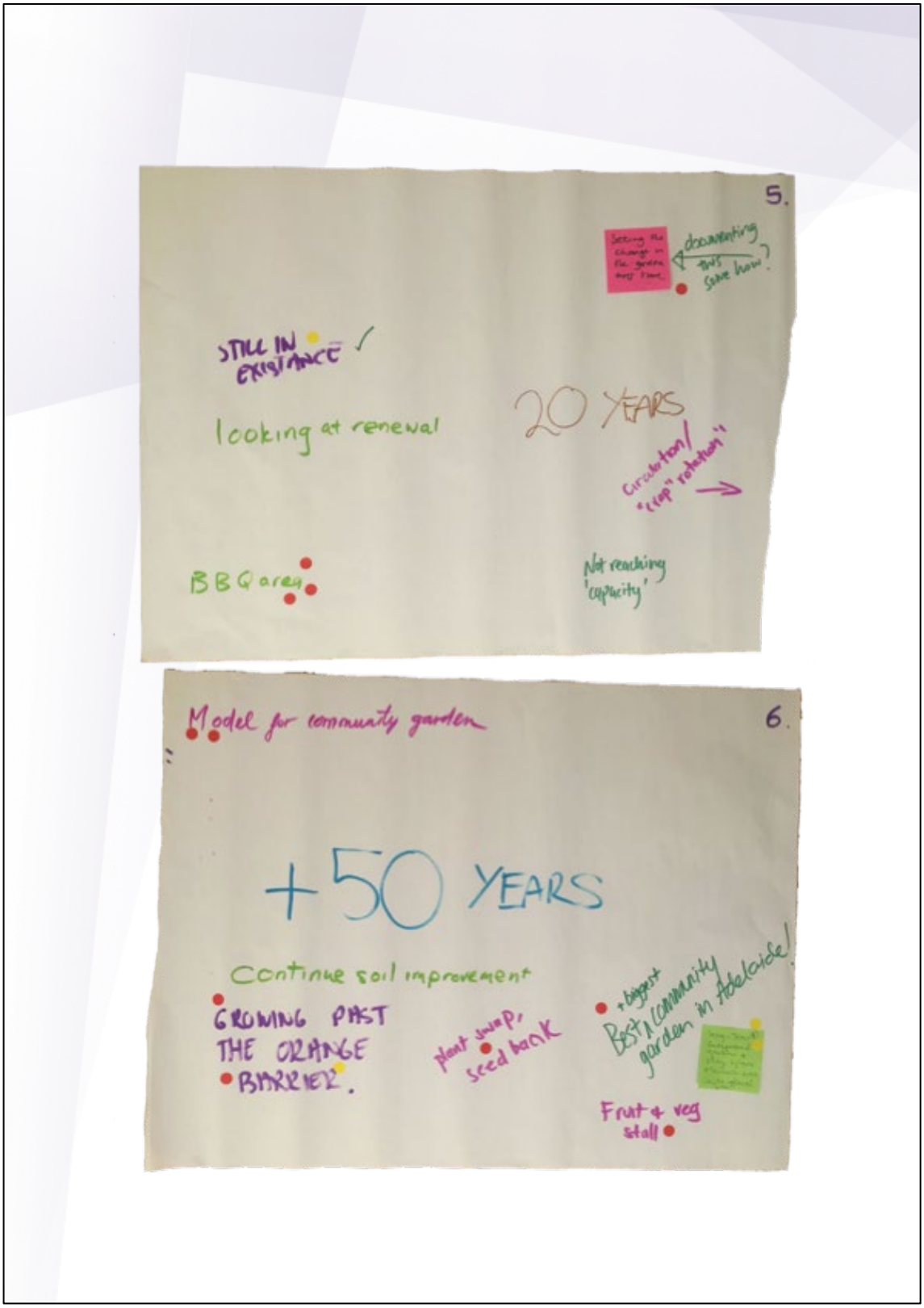
- Improving the site so there is no need for environmental restrictions (3 votes)
- BBQ area (3 votes)

Take your time and have a good look through all of the ideas that came out of this initial workshop because we are working on ways that we can continue to work on these in the comming workshops.




1.
Lettuce, kale, spinach.
+herbs.
planting fruit trees
Planting Vege's
12 MONTHS
community liaison
INTERESTING
potted plants
Local School Group
ANNUAL VEGIES.
HERBS.
Raised garden beds
2.
x3
Raised garden x2 beds
- picking things!
herbs / salads
WORMS
Growing veg
Building Shelter
Compost
picking oranges
PROJECTS / BUILDING
MAKING STUFF
Shade/ hang out area
A place to cook + prepare food/produce
A space for children to play + grow
Children's garden beds


Bench seats
FREE FRUIT FOR ALL
SEED BANK
4.
Pizza/ wood oven
Strong partnerships + support for garden
HEIRLOOM FRUIT
Some exotics?
3.
Productive fruit trees (potted)
Compost
Citrus to EAT
Annual Market
3 YEARS
picking green vegetable
beehives
EXPERIMENTAL AREAS
Not a 'closed' garden.
Community education/workshops sharing knowledge


5.
documenting
this
some how?
STILL IN EXISTANCE ✓
looking at renewal
20 YEARS
Circulation/ "crop" rotation"
BBQ area
Not reaching 'capacity'
Model for community garden
6.
+50 YEARS
Continue soil improvement
GROWING PAST THE ORANGE BARRIER.
plant swap, seed bank
+ biggest BEST community garden in Adelaide!
Fruit & veg stall

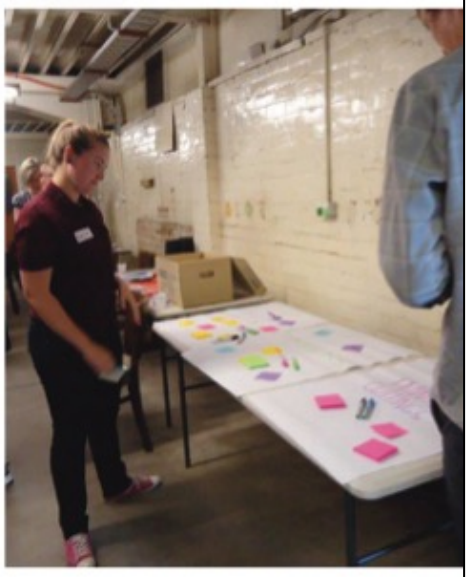
Group resources

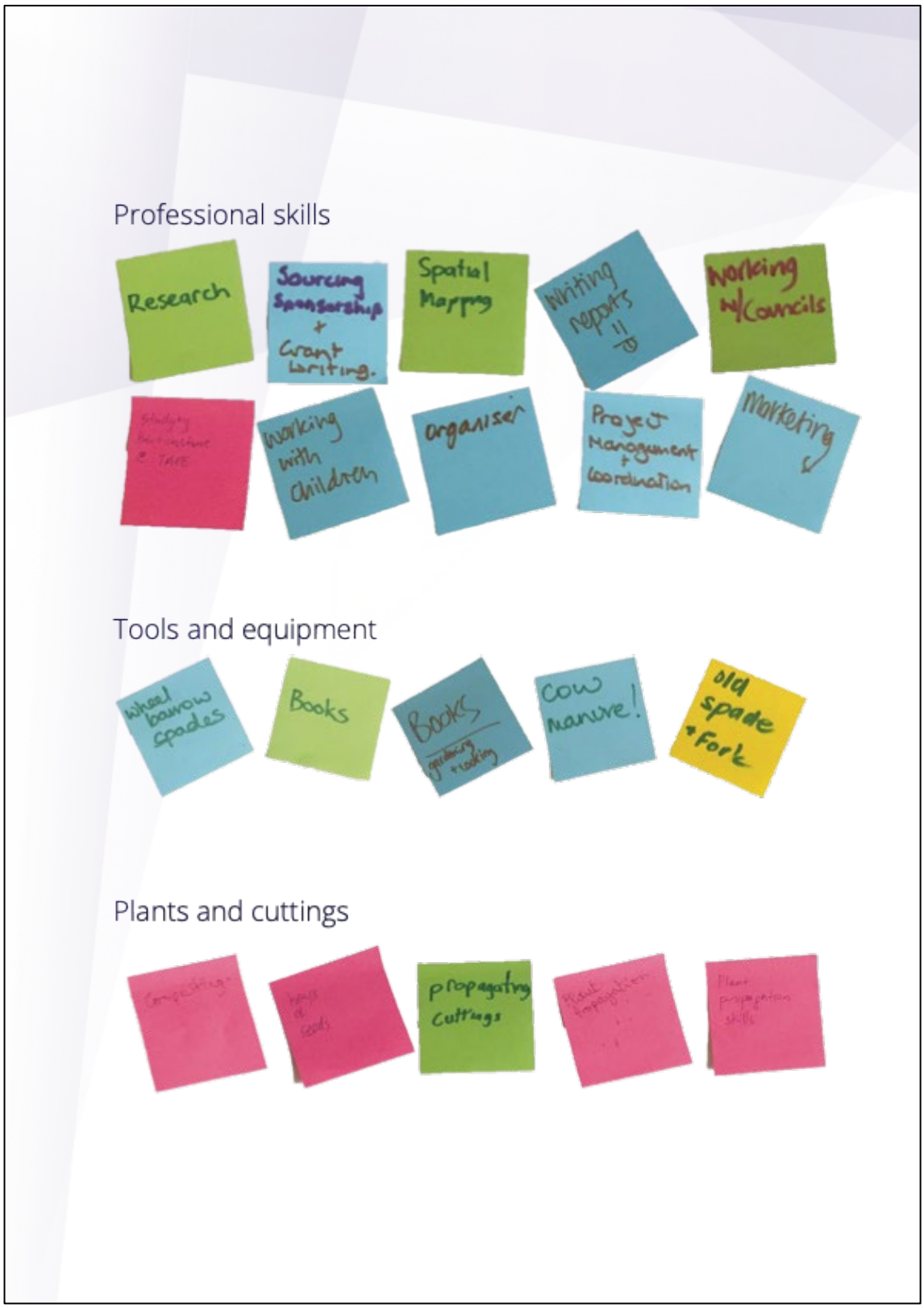
Everybody involved in this project has resources that they can bring. For some, this is an amount of spare time, for others, a passion, or professional expertise.

We wanted to start building up a picture of some of the resources that already exist within the group and were thrilled to see how many skills and passions emerged.

This is just the beginning of the list, and over time this list will grow as more people come to the project.

The following pages present the resources that were identified during this workshop.




Professional skills
Research
Sourcing Sponsorship + Grant writing.
Spatial Mapping
Writing reports !!
Working w/Councils
Working with Children
Organiser
Project Management + coordination
Marketing
Tools and equipment
wheel barrow spades
Books
Books
cow manure!
old spade + fork
Plants and cuttings
propagating Cuttings


Passions
working with children
Marketing
FUN!
Engaging
Enthusiasm
Hobbyist skills
More of a cook than a grower
arranging
Working bees
Camera/ photos
facebook posting.
Carpentry
Willing
Craft
hands
Other resources
TIME
TIME!
time
NEEDING
TIME
Love
Plant
Garden
Time
Positivity!

Where to next?

Workshop 2: Propagating a design

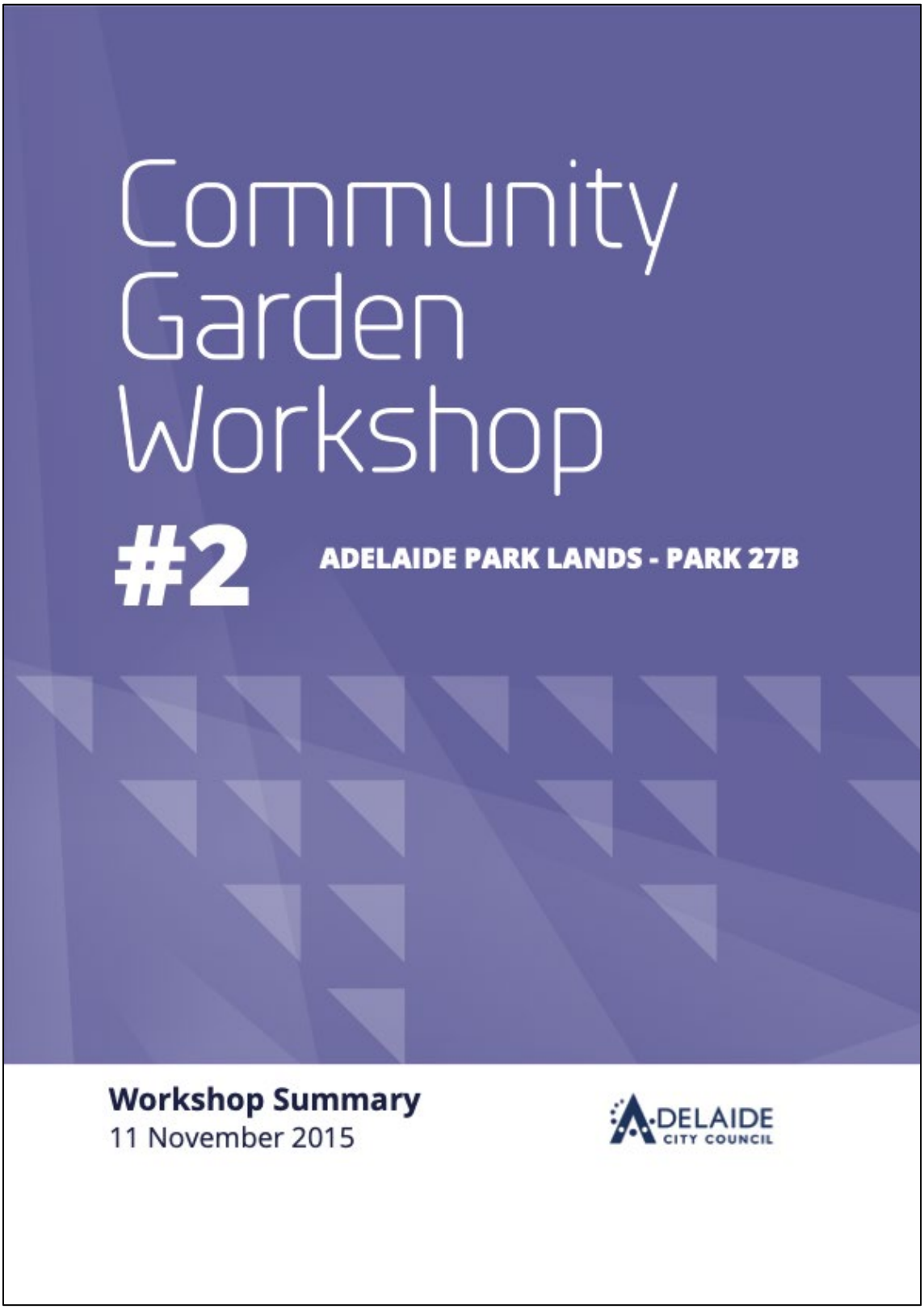
Workshop 3: Governance structure and strategy

Next workshop:

Wednesday 11th November 2015
5:30pm, Plant 1, Bowden

To get involved contact Diane Zerna on:
8346 7170 or diane.zerna@sa.gov.au

Appendix A.2: Parklands Community Garden Workshop Two (Design) Report



Thank you

Events like this cannot happen without the generous support of those who attend.

We had another great turn out to our second workshop and were thrilled to see some new faces as well as some returning from the first workshop.

For those who weren't able to attend, we are hopeful that this document may fill you in on some of the details of how things progressed in this workshop.

Workshop #2 Agenda

Site visits report

Propagating the future: seeds for discussion
- Coming, Being & Going
- Sustainability
- Materiality
- Beyond the Plants

Young experts picture card exercise

Hands on co-design session



Site visits

Following a brief recap of what happened during workshop 1 for those that were new to the project, our team presented some photographs and those that were present shared some experiences about the visits to other community gardens that had taken place between the first and second workshops.

One of the themes that continued to emerge during this presentation was the functions of a community garden beyond the growing of plants.

The following pages feature some of pictures from the visits taken by Andrew Bishop from Renewal SA.






ENQUIRIES
NEXT
MEETING
SUN 7/11
10.00AM







Coming, Being & Going

At this table, we created a huge story board to facilitate a discussion about the ways in which the garden might be used.

Some of the questions are obvious, but others came out of the rich and varied input we had in the first workshop.

What time might you visit the garden?

Weekends, afternoons and evenings seemed to be the most popular times so it will be important to consider how this works with the neighbouring sporting club.

Where might you come from? and how might you get to the garden?

Most people said they would be coming from home, sometimes by car and sometimes on foot or by bike.

What or who will you bring with you?

Continuing from the themes emerging in the first workshop we had a lot of people talking about bringing families and children to the garden as well as a couple who would come alone or with their pets.

What will you do in the garden?

As you might expect, this question generated a huge variety of discussions ranging from watering and maintaining plants through to people using the garden as an extension of their living space for relaxing and socialising.

Where would you like to take a rest?

Because the first workshop led to a lot of people talking about relaxing, sitting, meditating etc. we asked what sort of place people anticipated they would take a break in and had responses ranging from creating outdoor lounge room to finding a comfortable log to sit on.

What will you take with you from the garden?

While food and produce were obvious take-home items, many people also talked about taking away knowledge, friends, and a sense of community from the garden.


Afternoon
Evening
7days
Sunday Morning
Summer
-Evenings
-Mornings
Sun set
Weekends
WHAT TIME MIGHT YOU VISIT THE GARDEN?
school excursions
Home
Home
-Bowden
-Walk
via bike
Driving with plants
-Bowden
Walking
WHERE MIGHT YOU COME FROM? AND HOW MIGHT YOU GET TO THE GARDEN?
By myself
or
with niece
Family young kids.
GRAND CHILD
by myself
Pets
Children
baskets
WHAT BRING WITH YOU.
Garden
-plant
-water
Harvest
-cook
-pick
Socialise
-hang out
-Veges
-Herbs
-Fruits
-Relax
-Get out of house.
PICNICS
Food/Veg
SWAP
Fruit
Mindfulness activities
Tai chi
Yoga
HAVE BBQ
tables
chairs
Sit on a lounge
-siesta
In park w/ kids
-Seating
-Shelter
Eating Place
Big logs to sit & Relax
WHERE WOULD YO TO TAKE A RE
Food
Knowledge
-Chatting with community
Meeting Place
WHAT WILL YOU TAKE WITH YOU FROM THE GARDEN?

Sustainability

As one of the key priorities in planning a garden that can serve as a model for the future, sustainability was a topic that generated a lot of keen interest and great ideas.

This table discussed everything from water management strategies to food security and energy generation.




Farmers Kitchen food waste
dog
Bolw
Talk to Read those
Wicking beds
Solar lighting
Policy re organic garden. natural pesticides
talk Acc. about Compost
Rod house rain water
Compost Bins
Talk to Cafes re Collecting
Worm farm - schools / home
Tires for potting + flooring
Shredded rubber flooring
WIND MILL 4 Pumping water

Materiality

One of the biggest decisions we need to make as a community is what the garden will be made of. What follows are some highlights of a very rich and interesting discussion that took place during the workshop.

General strategy

Reusing and up-cycling were recurring themes along with a general desire for an eclectic mix of materials rather than 'polished' or 'finished' look.

Raised beds

As in the first workshop, there was a general consensus that raised garden beds are critical. This was echoed again in this workshop.

There were plenty of ideas for reusing materials rather than using virgin materials, from tyres to old doors.

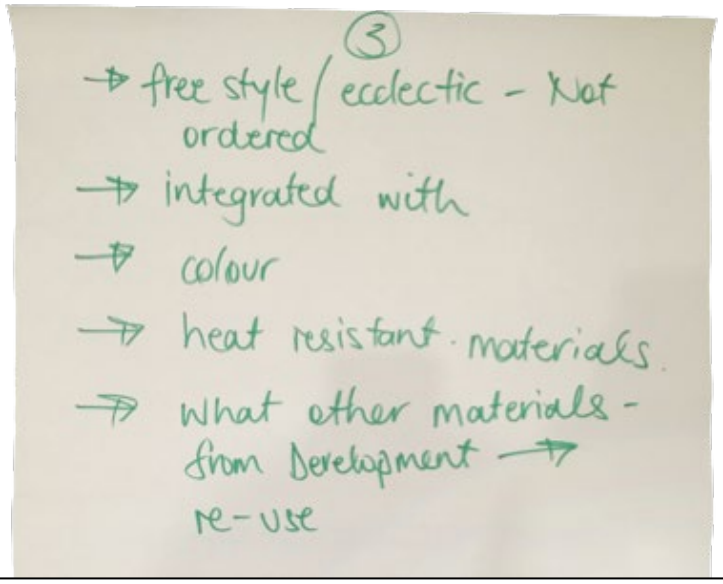
Boundary definition

Rather than establishing hard boundaries, using fruit or other trees to define soft boundaries proved a popular idea, along with using any walls created by the storage shed to grow climbers.

Pathways

There were plenty of ideas for what the pathways could be made from, with natural materials generally favoured.

While food and produce were obvious take-home items, many people also talked about taking away knowledge, friends, and a sense of community from the garden.



Materiality ①

- Raised beds - edges for seating
- long/thin gardens - access both sides - figure 8
- incorporate fruit trees
- recycled plastic

Pathways → fine bark → good drainage
→ pebbles/stones - last longer.
→ tyres - recycled - flowing/shredded
- flower/tree surrounds.
- paved main paths

Boundary → lattice with fruit/climbing.

Garden Shed → to blend in with surroundings

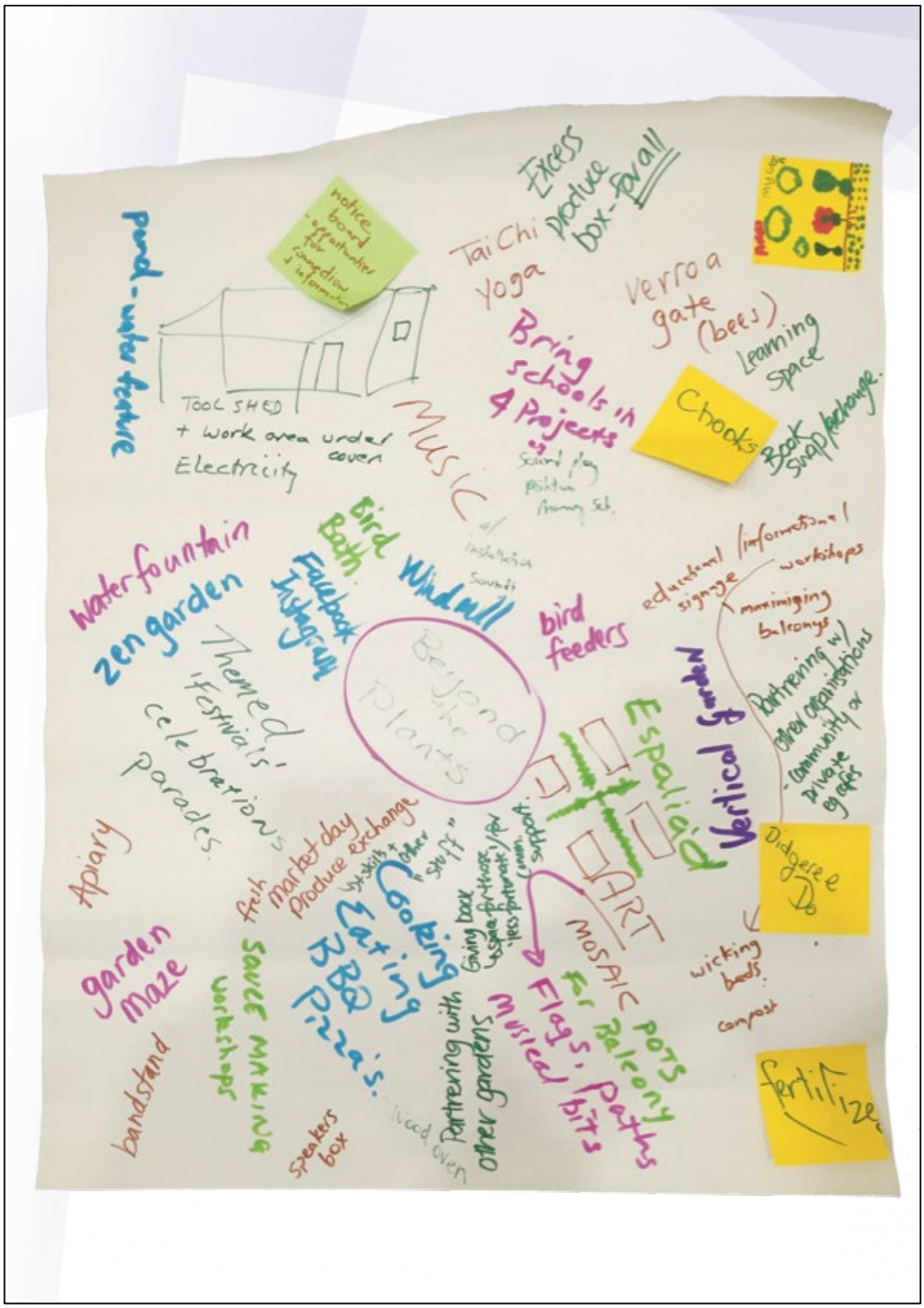
② - Pavers/tiles paths or edging
- Recycled tyres for edging
- Old bicycle wheels
- Recycled books → library.

→ fruiting hedges
→ provides barrier (soft) & green.
→ scarecrows/owls to keep vermin away.
→ fox free/cats/poultry - chicken pen
→ tower & wind turbine
- spiral/labyrinth -

Beyond the plants

Another lively discussion was had at this table with a real enthusiasm coming across for the garden to be about more than just growing plants.

There were plenty of ideas coming up at this table from small scale projects like a birdbath to larger strategies like ensuring there is space for future festival type activities.


pond - water feature
notice board
TOOL SHED
+ work area under cover
Electricity
Excess produce box - for all
Tai Chi
Yoga
Verroa gate (bees)
Learning space
Bring schools in 4 Projects
Chooks
Book swap/exchange
MUSIC
Bird Bath
Windmill
waterfountain
zen garden
Facebook
Instagram
bird feeders
Beyond the plants
Themed festivals/ celebrations
Parades
Espaliered
Vertical Garden
Partnering w/ other organisations
Community or private groups
Didgeree Do
Apiary
fruit
Market day
Produce exchange
Cooking
Eating
BBQ
Pizza's
Giving box
Lessons/workshops
Mosaic pots
Flags
Paths
Musical bits
garden Maze
bandstand
Sauce making
workshops
speakers box
Partnering with other gardens
wicking beds
compost
Fertilize

Young experts

At our second workshop we had some young experts come along.

Because the inclusion of spaces for children was identified as a critical area of focus at the first workshop, we asked the two primary school aged children at the second workshop to undertake the picture card exercise that was done at the first workshop.

They were presented with the same picture cards we used at the first workshop and came up with some insightful and creative responses.

There were two cards that were chosen by both, but generally there was an attraction to colour, pattern, artwork, creative activities and places that looked like they would be nice to spend time in.



Spirals and loops

A maze to explore


Cute mushrooms
People making things
Different colour flowers and mushrooms
A nice garden to be in
Colour of flowers and leaves
I just like it
Stone statues


Yoga sessions
Colours
Nice leaves and funky owls
Patterns
Flamingos
Strawberries

Hands on co-design

After all of the great conversations around the four workshop themes, we turned to our enormous 1:100 scale plans of the garden to start to co-create a strategy for the garden.

This was a great deal of fun and we split into two groups to start discussing the layout and design of the garden.

After some time spent designing, the two groups presented their ideas to each other and realised that they had come up with remarkably similar ideas. Together, these plans establish a few key decisions such as where the garden beds should be, where resting and recreation areas should be, where the storage should be, where the entry and exit points should be, where areas will be set aside for children to play, and how to incorporate the many wonderful ideas that have emerged from the two workshops so far.

This has given our planner Rod some great information that he is in the process of turning into some sketch design documents that will become a part of your submission to council.






PARK TERRACE
RAILWAY TO GAWLER
PARK LANDS TRAIL
PARK TERRACE UNDERPASS


PARK TERRACE
RAILWAY TO GAWLER
BASKETBALL COURT
TENNIS COURT
RAISED BEDS
Planter beds
Seats
NEW LIGHTING & PUBLIC ART IN UNDER PASS

Where to next?

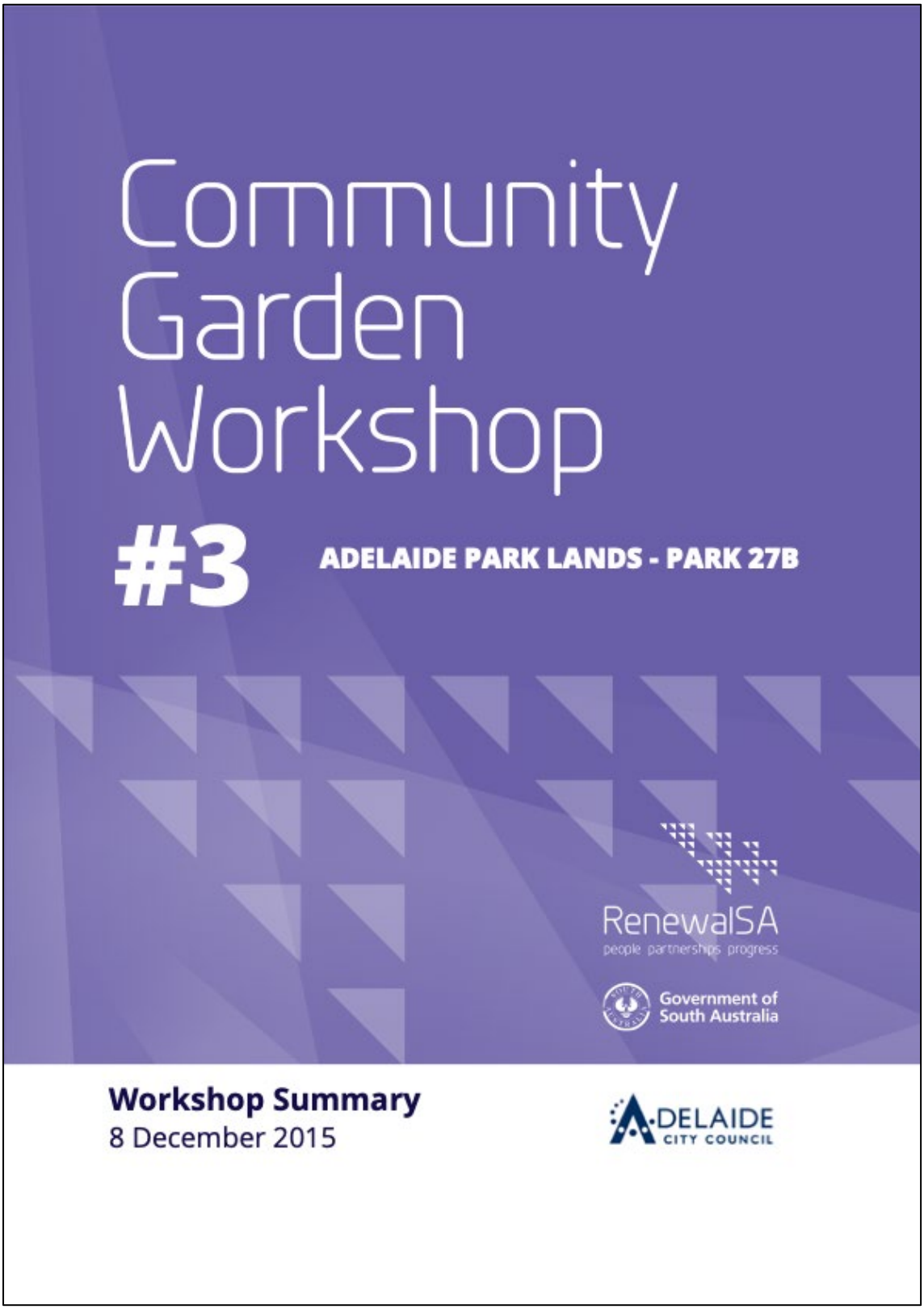
We are almost done with the planning workshops and ready to hit the ground running. We just have one final workshop planned to help plan the submission to the Adelaide Park Lands Authority and the Adelaide City Council.

Workshop 3: Distillation, governance structure and strategy going forward.

Tuesday 8th December 2015
6:00pm - 7:30pm, Plant 1, Bowden

To get involved contact Diane Zerna:
8346 7170 or diane.zerna@sa.gov.au

Appendix A.3: Parklands Community Garden Workshop Three (Rationalisation) Report



Thank you

This was our third and final workshop of the series and we are now at a point where we can start to bring the vision for the garden into reality.

Everyone who has participated across the three workshops has made a tremendous contribution to the process.

A big thank you to those who came along to this workshop to help us with the more detailed decision making, and for those who have already signalled an interest in taking a leadership role or being a part of the committee going forward.

For those who weren't able to attend the workshop, this document should hopefully fill you in on how things have progressed. Remember, this is just the beginning and there will be plenty more opportunities to get involved as we continue into the approvals, construction and operation phases.

Workshop #3 Agenda

Co-design activity progress

How to spend?

How to operate?

Next steps



Co-design progress

Everybody who participated in the co-design activity at the end of the second workshop did a fantastic job of starting to create a shared vision for how the garden is going to function.

The two broad plans created at that workshop were studied by our planning consultant and turned into a more formal sketch-design that was presented back to those that were present at the third workshop for critique and review.

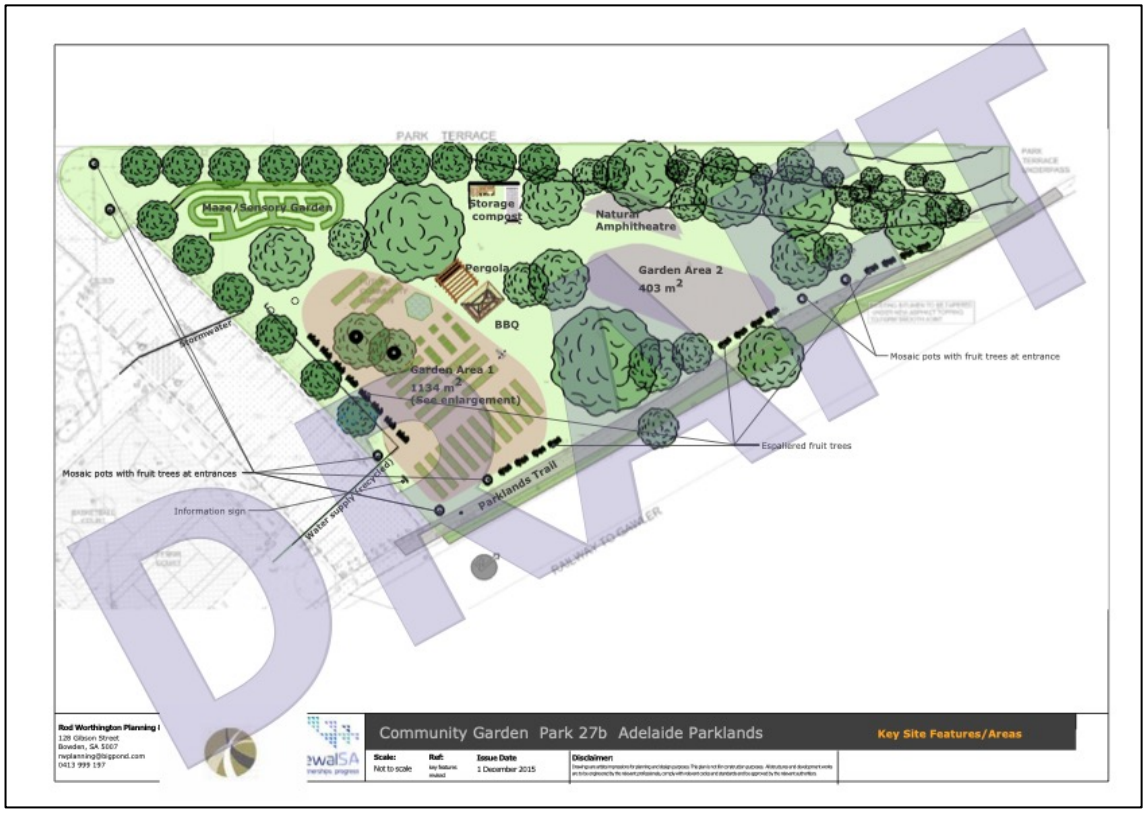
The plans were well received and the general site strategy was strongly supported.

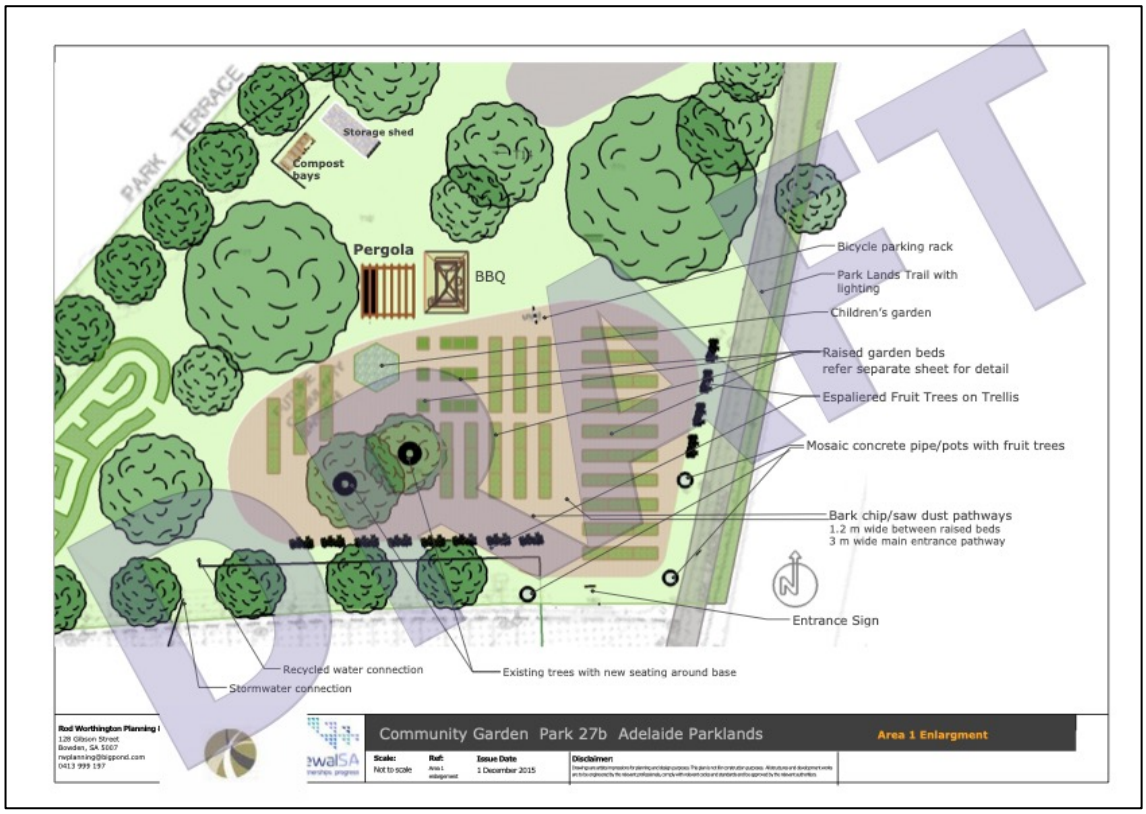
The following pages contain the draft plans that were presented at the third workshop that will now be updated to reflect the feedback from the budgeting exercise that we undertook at this workshop.

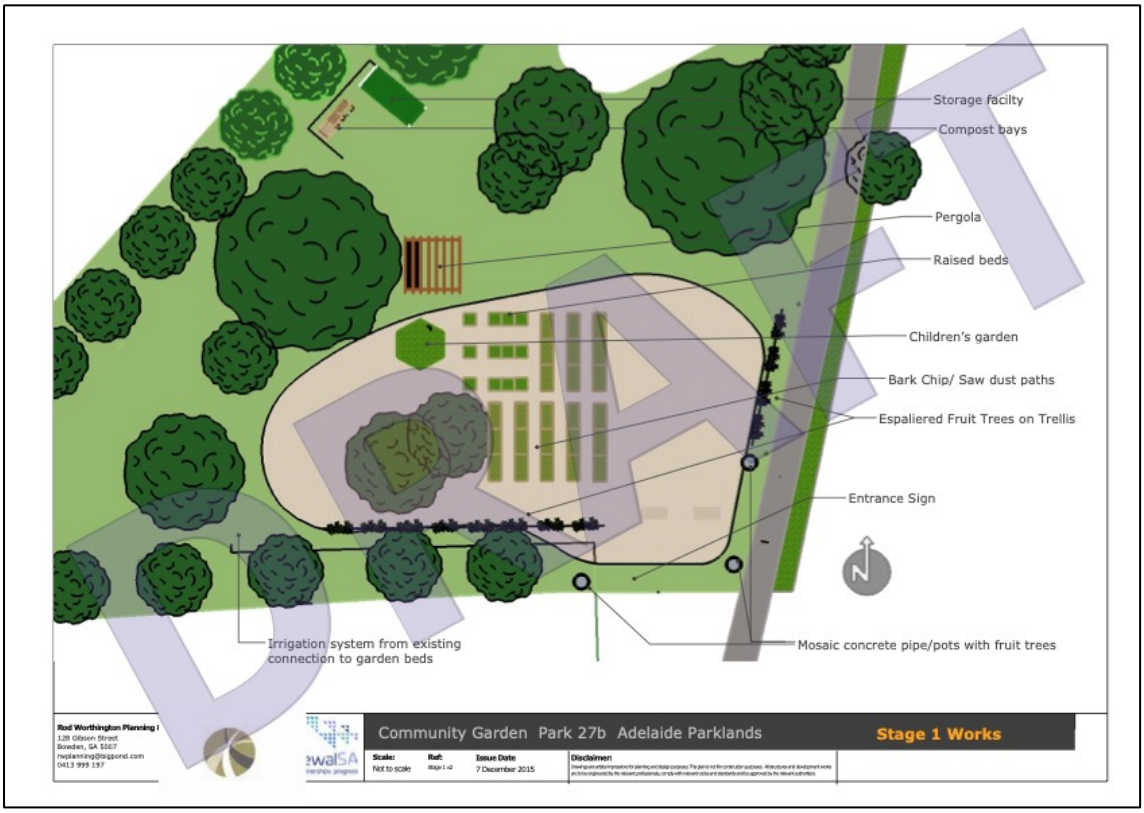


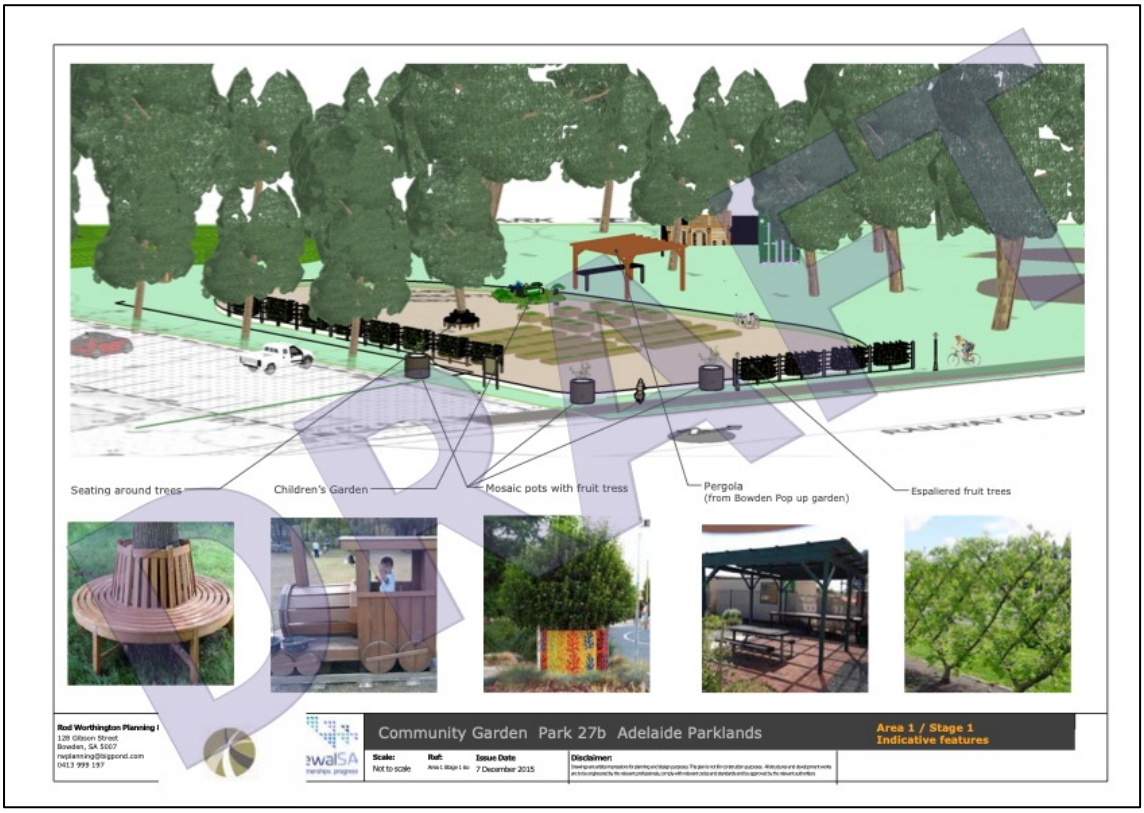





PARK TERRACE
Maze/Sensory Garden
Storage compost
Natural Amphitheatre
Pergola
Garden Area 2
403 m2
BBQ
Stormwater
Garden Area 1
1134 m2
(See enlargement)
Mosaic pots with fruit trees at entrance
Espaliered fruit trees
Mosaic pots with fruit trees at entrances
Parklands Trail
Information sign
Water supply (recycled)
PALMER TO GAWLER
Community Garden Park 27b Adelaide Parklands
Key Site Features/Areas
Scale: Not to scale
Ref: Key features revised
Issue Date 1 December 2015
Disclaimer:
Rod Worthington Planning
128 Gibson Street
Bowden, SA 5007
rwplanning@bigpond.com
0413 999 197
DRAFT


PARK TERRACE
Storage shed
Compost bays
Pergola
BBQ
Bicycle parking rack
Park Lands Trail with lighting
Children's garden
Raised garden beds
refer separate sheet for detail
Espaliered Fruit Trees on Trellis
Mosaic concrete pipe/pots with fruit trees
Bark chip/saw dust pathways
1.2 m wide between raised beds
3 m wide main entrance pathway
Entrance Sign
Recycled water connection
Stormwater connection
Existing trees with new seating around base
Community Garden Park 27b Adelaide Parklands
Area 1 Enlargment
Scale: Not to scale
Ref: Area 1 enlargement
Issue Date 1 December 2015
Disclaimer:
Rod Worthington Planning
128 Gibson Street
Bowden, SA 5007
rwplanning@bigpond.com
0413 999 197
DRAFT


Storage facilty
Compost bays
Pergola
Raised beds
Children's garden
Bark Chip/ Saw dust paths
Espaliered Fruit Trees on Trellis
Entrance Sign
Irrigation system from existing connection to garden beds
Mosaic concrete pipe/pots with fruit trees
Community Garden Park 27b Adelaide Parklands
Stage 1 Works


Seating around trees
Children's Garden
Mosaic pots with fruit tress
Pergola
(from Bowden Pop up garden)
Espaliered fruit trees
Community Garden Park 27b Adelaide Parklands
Area 1 / Stage 1
Indicative features

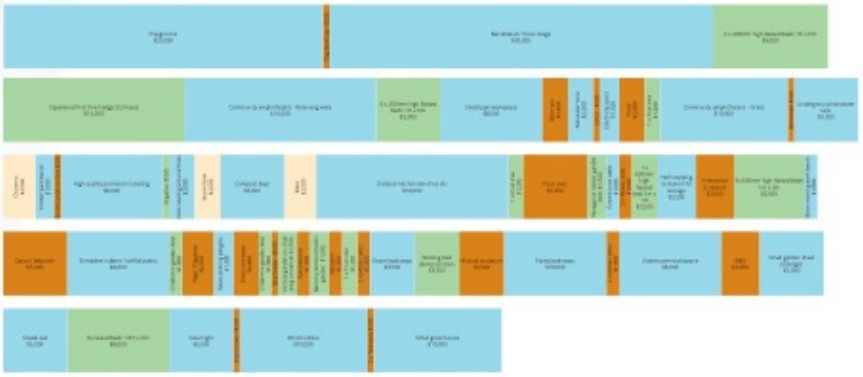
How to spend?

The Park Lands community garden project is being generously supported with funding by Renewal SA and will hopefully also be supported by a civil works training program.

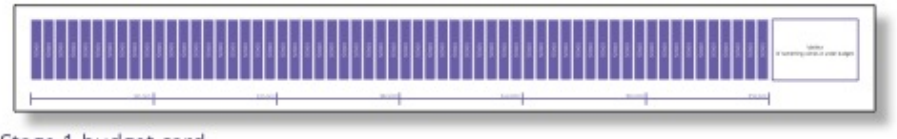
We have generated some fantastic ideas, concept and plans right across the three workshops. One of our most difficult challenges is to distill these ideas and concepts down into the key components that will be delivered with the funding from Renewal SA.

To do this, we conducted a participatory budgeting exercise where each person at the workshop was given a card that represented the stage 1 budget, and a series of strips with shapes that represented the estimated cost of each of the ideas that had come up during the two previous workshops.

Each person then was tasked with choosing which projects would fit within the Stage 1 budget, and which might have to wait for later. The following pages show the results of this exercise and the analysis. Items that were included in the budget were given a weighting of 1 unit while items placed in the 'wishlist' section at the end of the budget were given 0.5 units of weighting.

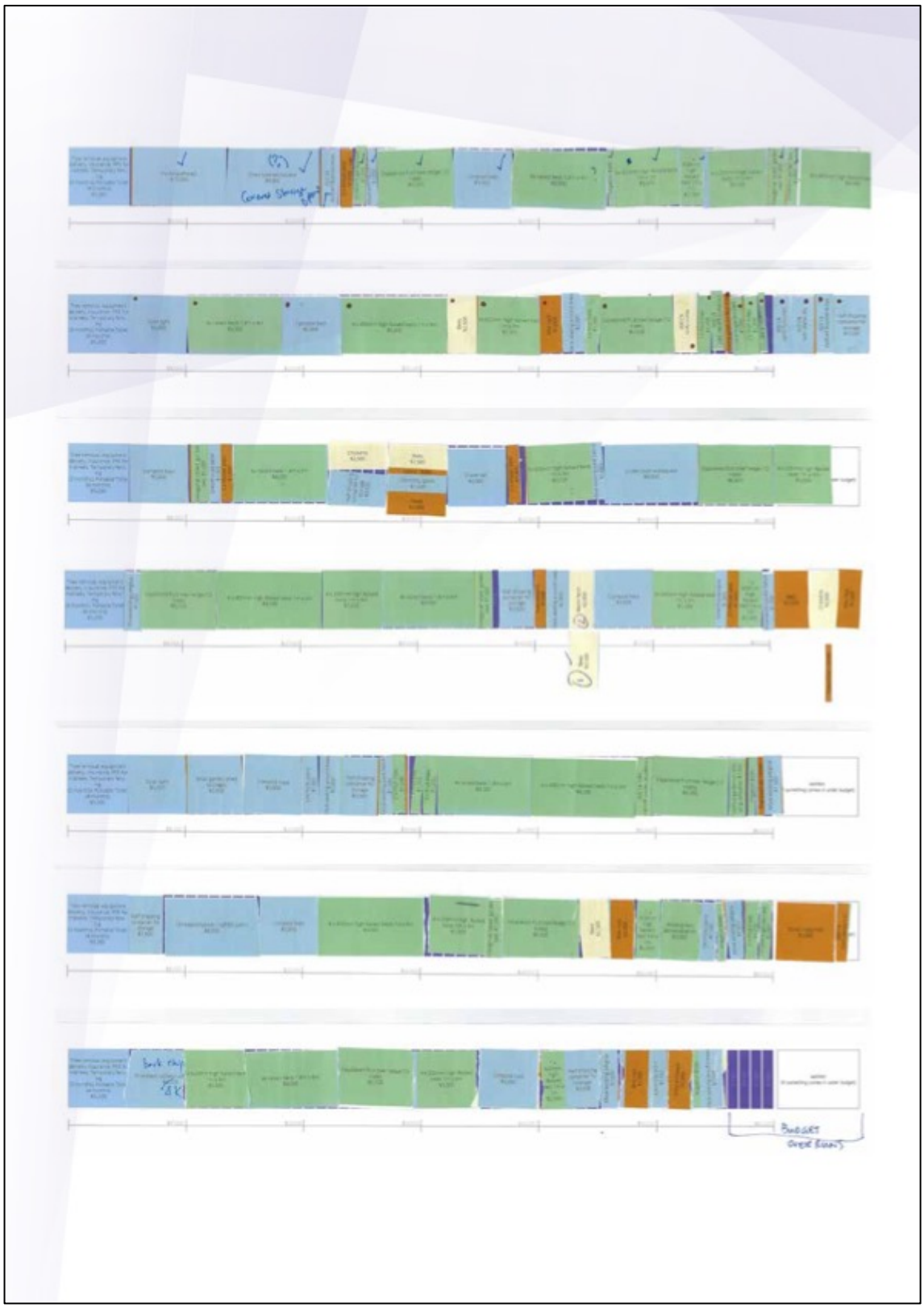


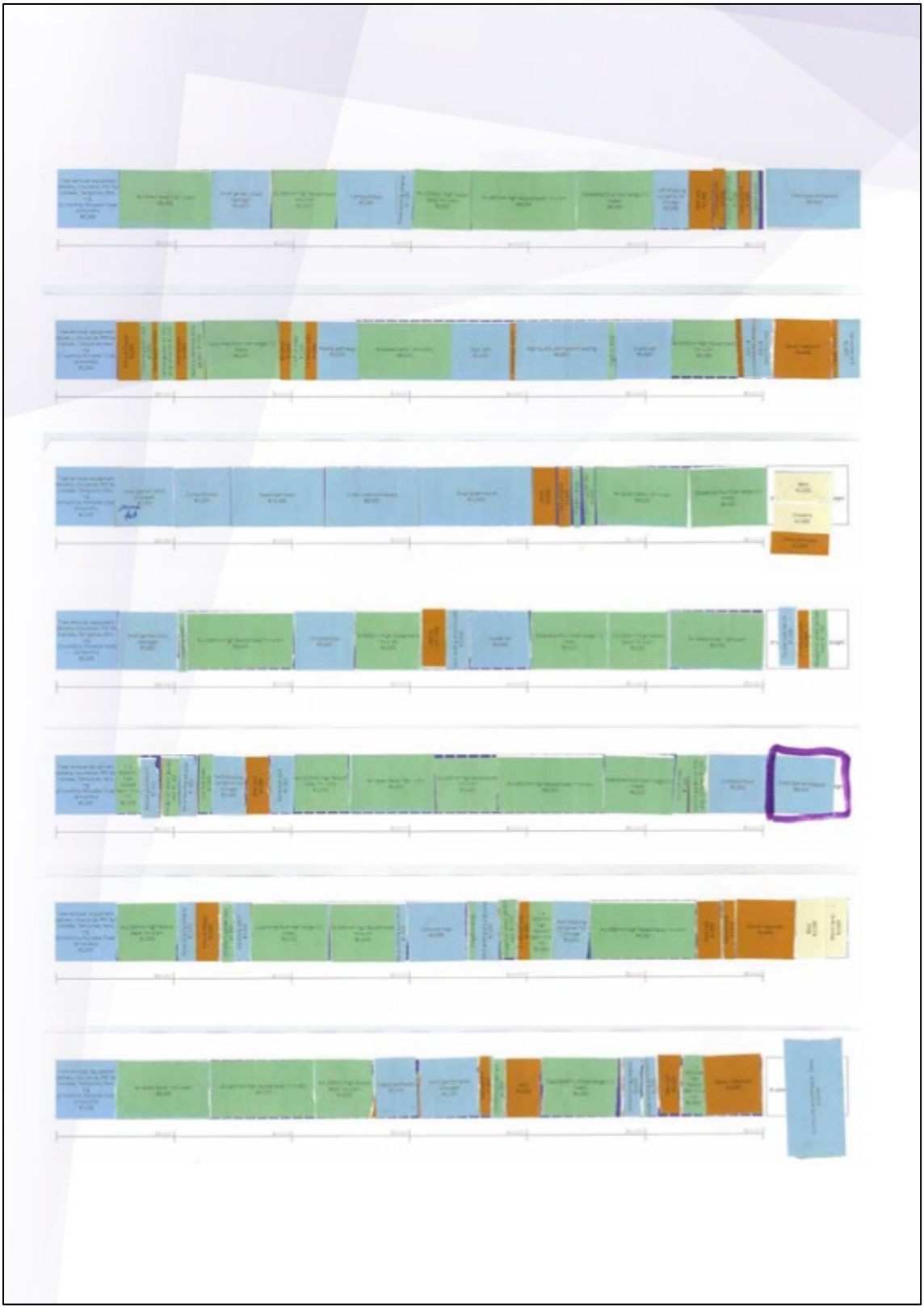
Estimated cost pieces



Stage 1 budget card







Item	Budget version													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Espaliered fruit tree hedge (12 trees)	1	1	1	1		1	1	1	1	1	1	1	1	12
Compost bays	1	1	1	1	1	1	1		1	1	1	1		11
4 raised beds 1.8m x 6m	1	1	1	1	1		1	1	1	1	1		1	11
4 x 400m high raised beds 1m x 6m	0.5	1		1	1	1	1			1	1	1	1	9.5
Irrigation	1	1			1	1	1	1	1	1		1		9
3 x 600mm high raised beds 1m x 3m	1	1	1	1			1	1		1	1	1		9
2 x Fruit trees		3			3			1			2			9
4 x 200mm high raised beds 1m x 6m	1		0.5	1		1	1			1	1	1	1	8.5
Move existing pergola	1	0.5		1	1		1				1	1	1	7.5
Mosaic Pots	1		2	1			1	1		0.5		1		7.5
Children's garden bed	1.5	1					1	1	1			1	1	7.5
Bike Rack		1		0.5		1	1			1	1	1	1	7.5
Move existing bench	1		1	1	1							1	1	6
1 x 600mm high raised bed 1m x 1m	1			1		1					1	1	1	6
Hexagonal raised garden bed	0.5		1	1		1				0.5	1	1		6
Deck seating around trees		1		1	1	1				1		1		6
Noticeboard				1			1	1	1			1	1	6
Half shipping container (storage)		0.5		1	1	1	1				1			5.5
Small garden shed (storage)					1		1		1	1			1	5
Bees		1	1	1		1			0.5			0.5		5
Electricity point		0.5	1		1	1		0.5				1		5
Entry archways						1		1	0.5			1		3.5
Solar light		1			1			1						3
Shade sail			1					1		1				3
Vertical garden on shipping container					1			1			1			3
Timber park bench								1		0.5	1			2.5
Paved pathways	1								1					2
Undercover workspace			1						1					2
Shed type workspace	1						0.5				0.5			2
Spiral / Labyrinth								0.5				0.5	1	2
Chickens			1	0.5					0.5					2
Worm farm		1		0.5								0.5		2
Pond			1						1					2
Rainwater tank		0.5						0.5			1			2
Pebble paths								1					1	2
Greenhouse table			1	1										2
Lattice			1					0.5						1.5
Scarecrows				0.5				1						1.5
BBQ				0.5									1	1.5
Small greenhouse									1					1
Excess produce box								1						1
High quality permanent seating								1						1
Wicking bed demonstration						1								1
Balcony garden demonstration								1						1
Community amphitheatre - grass													1	1
Windmill								1						1
Shredded rubber / softball paths						1								1
Bird feeder								1						1
Dog bowl					1									1

How to operate?

After planning how we would build the garden, it was time to start to think about how the garden will be operated and organised.

We had a brief discussion about some of the formal and informal roles that typically exist within the steering group / committee of a community garden then had an informal chat about who might be interested in taking on these roles.

There was not a formal nominations process or any roles allocated during this workshop because we need to contact everyone who has signalled an interest in the garden to see whether they would like to be involved in this steering group / committee.

The roles that we envisage will need to be filled initially are described on the next page.



Chairperson

The chairperson is tasked with organising and running steering group / committee meetings and is normally someone who will take a lead role in representing the interests of the garden to other community and government groups.

Expect a time committment of 10 -15 hours per month for the administrative parts of this role.

Treasurer

The treasurer role is usually taken on by someone with experience in managing budgets and is focussed on ensuring the garden remains viable, and grants and other monies are distributed properly. Experience in (or a keen interest in learning about) grant application writing would be a big plus for this role.

Expect a time committment of 6-12 hours per month for the administrative parts of this role.

Secretary

The secretary is normally responsible for the recording of decisions and processes as well as for the dissemination of information among garden members. Good word processing skills are an advantage, and you should expect a time committment of roughly 6-12 hours per month for the administrative parts of this role.

Steering group / committee member

Steering group / committee members are people that are looking to take on a role in steering the direction of the garden without the formal respsonsibilities of some of the other roles.

Expect a time committment of roughly 5 - 10 hours per month to attend meetings and coordinate projects.

Founding garden member

This is an opportunity to be an important part of the garden without necessarily committing to a formal role in the management and organisation of the garden.

Founding members will be responsible for establishing the initial plantings and helping to show that the garden as a great organisation for local residents and businesses to be involved in.

Other role

In the first workshop we asked people to signal some of the skills and resources they could bring ot the garden. There were a number of exiting skills listed that would be great to incorporate into the garden so if you are still interested in taking on a role that is not described here, let the team know so that we can create one.

If you would like to signal your interest in any or all of these roles, please get in contact with the team via the contact details on the last page of this document.

Next steps

The draft design of the garden will be refined based on the feedback from this workshop, and we are looking to start arranging some steering group / committee meetings early in the new year.

There are still plenty of ways to be involved both during what's left of 2015 and early in 2016.

Key dates going forward:

December 2015 — January 2016
Draft plans approved by steering group / committee and submitted to APLA.

January 2016
APLA meeting and hopeful support for the project

Work to form an incorporated body to obtain insurances etc.

February 2016
Council assessment of plans

March 2016
Start of construction works and garden planting

To get involved in the steering group / committee or to provide any feedback on the process so far, please contact:

Diane Zerna
ph. 8346 7170
e. diane.zerna@sa.gov.au

Appendix B: Case C: U City workshop reports

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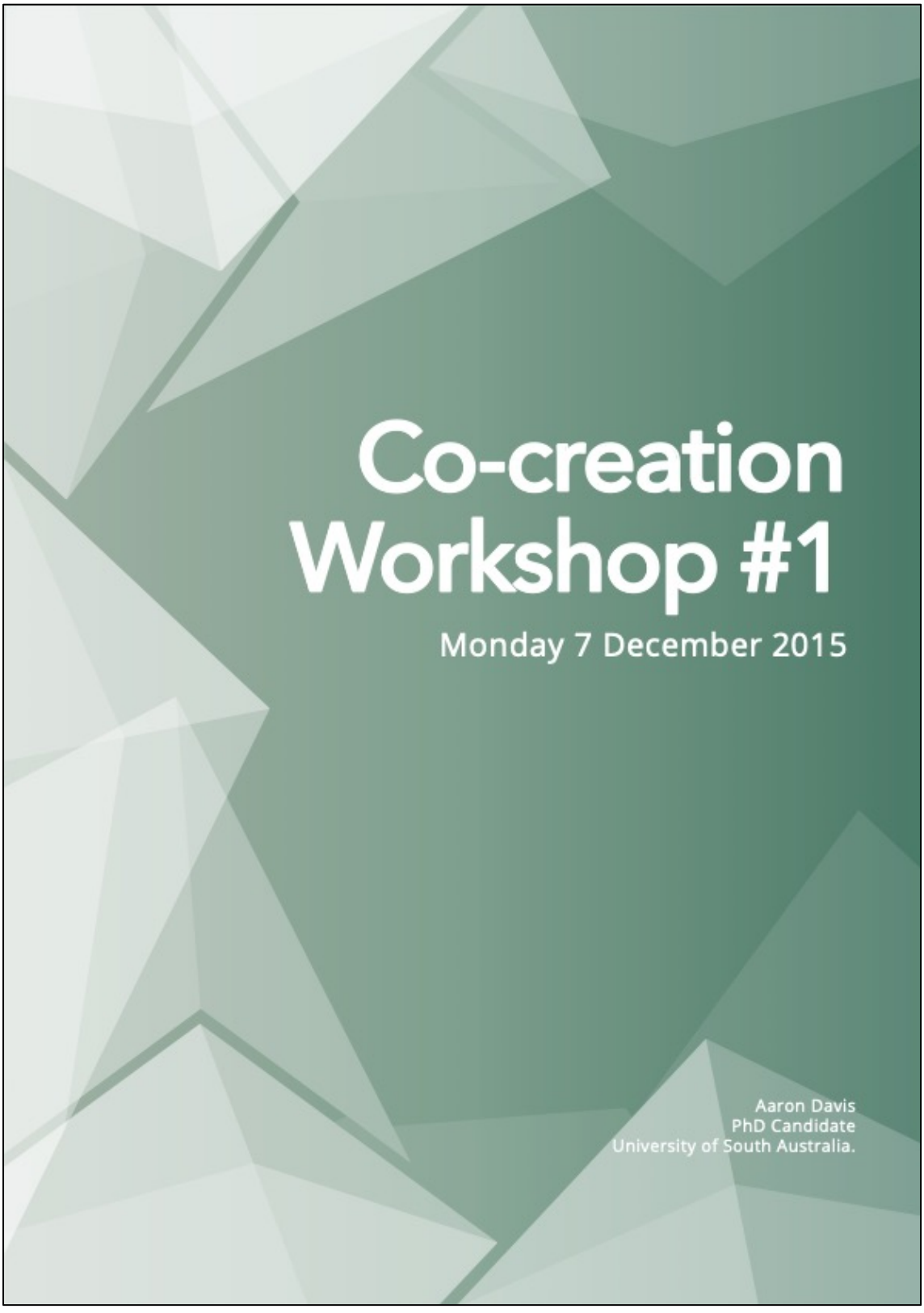
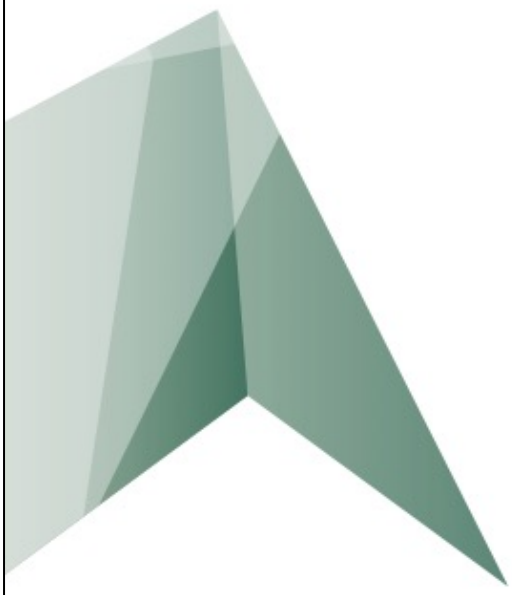
Appendix B.1: U City Workshop One Report



About the workshop

This workshop was the first of a series planned to investigate whether co-creation tools and strategies can be applied to projects in the built environment. This series is intended to forma a part of a larger PhD research project at the University of South Australia.

Approximately 20 participants were invited to attend by Uniting Communities senior management on the basis that they represented a broad cross section of the Uniting Communities staff group.



Contents

1: What works? What doesn't? 4
Analysing existing Uniting Communities facilities and workspaces.

2: Coming, being and going. 10
Movement to, around, and from the existing Pitt St building.

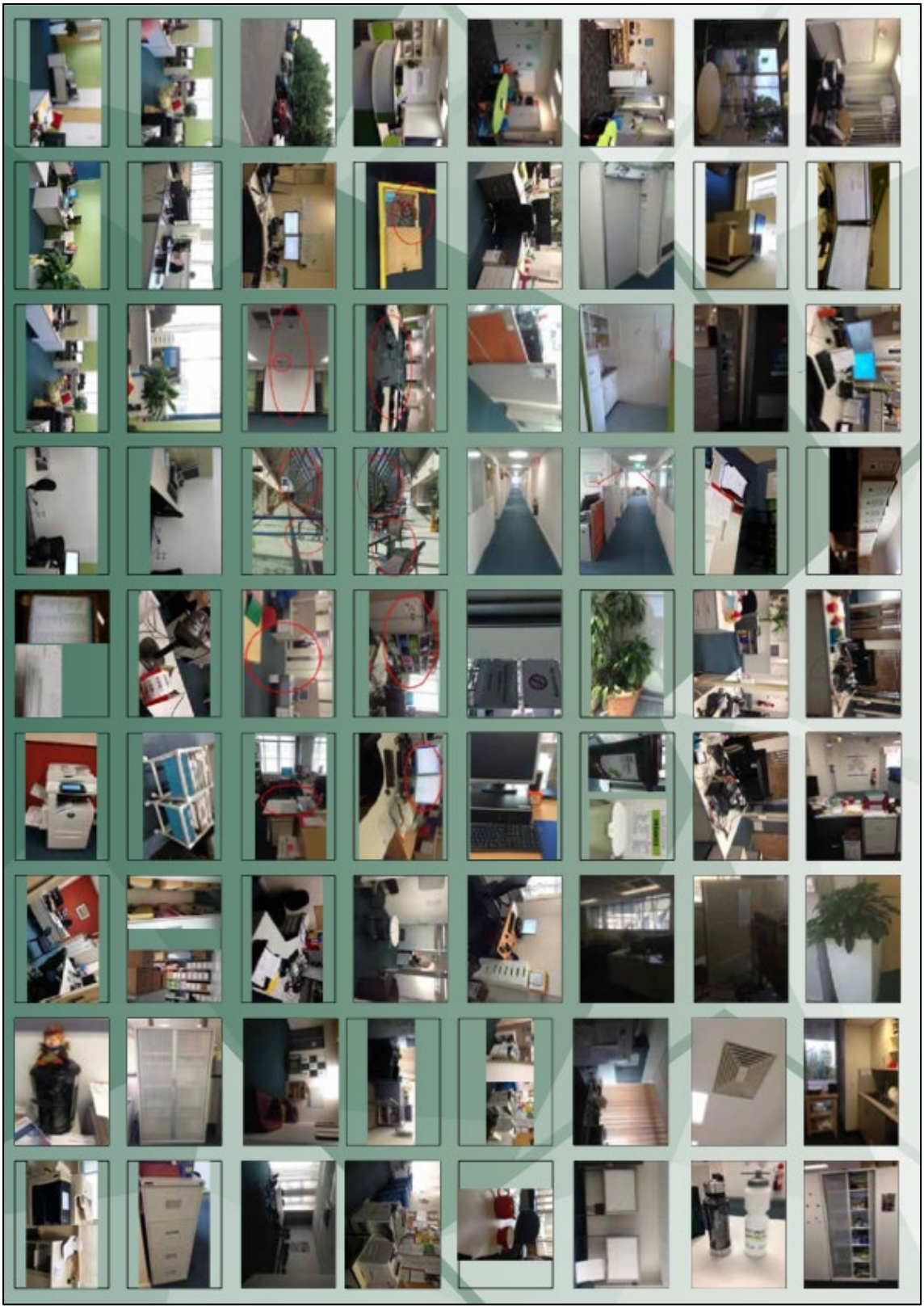
3: Aspirations exercise. 16
Beginning to define the space that best suits Uniting Communities.

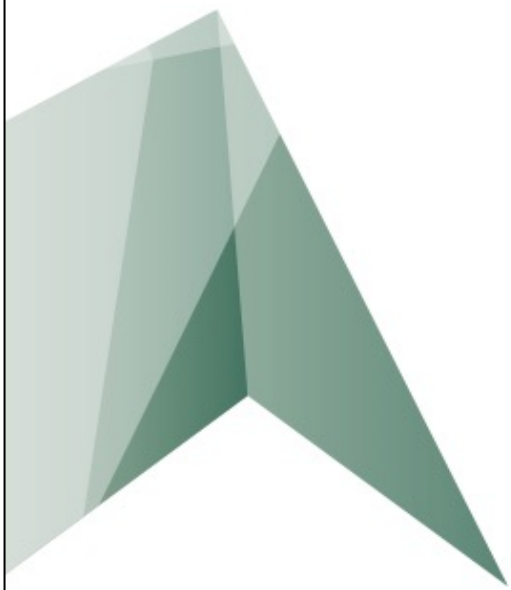


This exercise was focussed on exploring the aspects of Uniting Communities' existing facilities and workspaces that work well for staff and/or client groups, and those that don't work so well for staff and/or client groups.

Participants were split into four groups and asked to look at a series of picture cards submitted prior to the workshop. There were some annotations on the back of these cards already, and each table was asked to make some notes on the positive and negative aspects of each image.

Each table then presented their five best and five worst images to the group to start to share their insights. Responses have been recorded from both the cards and the presentation back to the group.



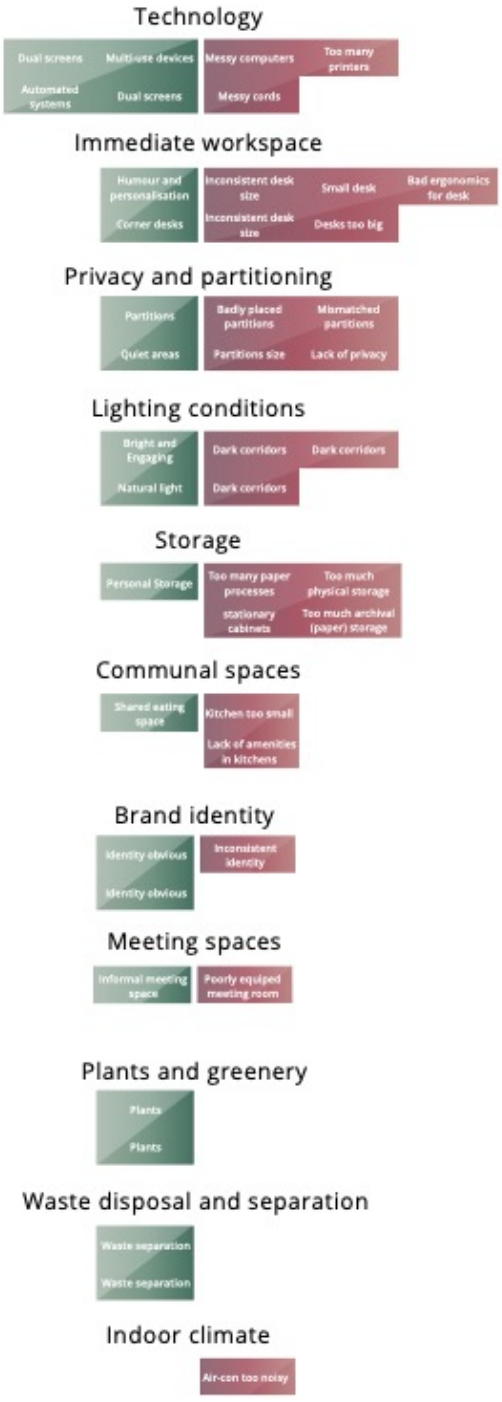


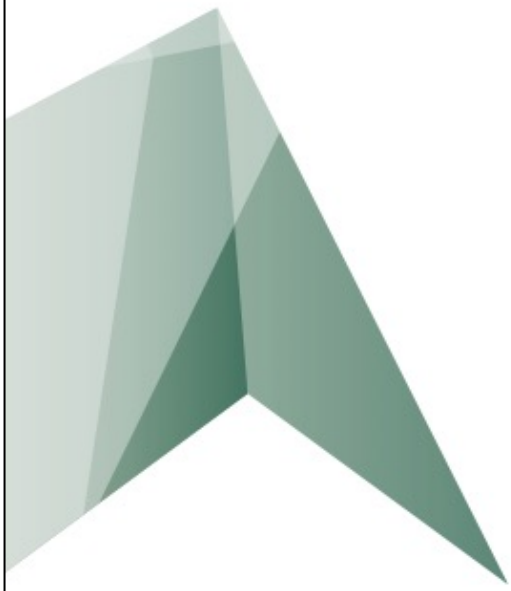
Top five analysis

Issues surrounding the application of technological solutions, the design and allocation of individual workstations, and lighting conditions were repeatedly identified as a key issue to consider.

Technological solutions generated the most positive responses while the size of desks was highlighted as an area of concern.

There were also a number of themes that were less frequently highlighted but were raised as important issues to consider going forward. These included the provision of communal or shared spaces and the maintenance of brand identity.


Technology
Dual screens
Multi-use devices
Automated systems
Dual screens
Messy computers
Too many printers
Messy cords
Immediate workspace
Humour and personalisation
Corner desks
Inconsistent desk size
Inconsistent desk size
Small desk
Bad ergonomics for desk
Desks too big
Privacy and partitioning
Partitions
Quiet areas
Badly placed partitions
Partitions size
Mismatched partitions
Lack of privacy
Lighting conditions
Bright and Engaging
Natural light
Dark corridors
Dark corridors
Dark corridors
Storage
Personal Storage
Too many paper processes
stationary cabinets
Too much physical storage
Too much archival (paper) storage
Communal spaces
Shared eating space
Kitchen too small
Lack of amenities in kitchens
Brand identity
Identity obvious
Identity obvious
Inconsistent identity
Meeting spaces
Informal meeting space
Poorly equiped meeting room
Plants and greenery
Plants
Plants
Waste disposal and separation
Waste separation
Waste separation
Indoor climate
Air-con too noisy



Combined analysis

When combined with the responses written on the cards, issues surrounding the application of technological solutions, the design and allocation of individual workstations, and lighting conditions remained the key issues to consider.

Good privacy arrangements, technological solutions, and lighting conditions generated the most positive responses. Immediate workspace environment and technological solutions generated the most negative responses.

The more exhaustive analysis continued to build a picture of the importance of communal / shared spaces and the Uniting Communities identity.

Technology



Immediate workspace



Light conditions



Privacy and partitioning



Storage



Communal spaces



Meeting spaces



Brand identity



Plants and greenery



Colours and personalisation



Windows and views



Indoor climate



Waste disposal and separation



Parking and access



2: Coming, being & going

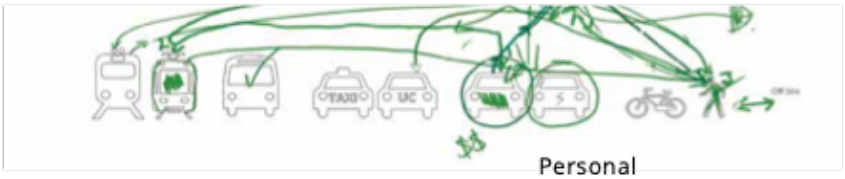
In the second exercise participants were asked to trace their journey across a typical day or week. This involved considering the way people were travelling to work, where they were going within the Pitt St building, where they had meetings, lunch, client visits etc., and how they went home at the end of the day.

The maps have been overlaid to build a picture of this movement. While self reporting is not always accurate, these maps highlight perceptions of the under-performance of current communal spaces, and some of the challenges associated with having multiple forms of circulation in a single space.

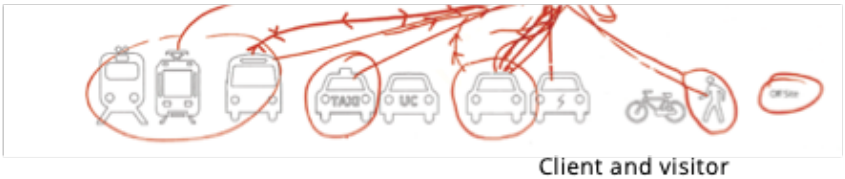
This exercise has also been used to start building a picture of the transport patterns associated with Uniting Communities staff and visitors. While these transport patterns are not included in the Uniting Communities carbon footprint calculation, they are an important part of the holistic experience of Uniting Communities' staff, clients and visitors.



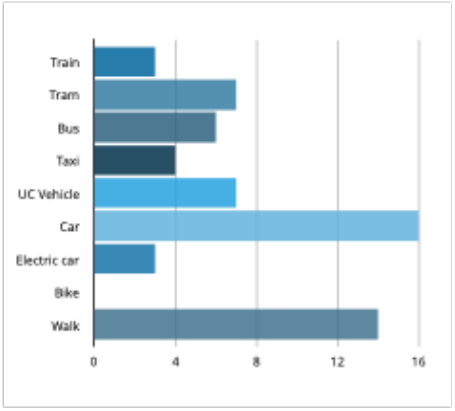
Professional



Personal



Client and visitor



Transport

A variety of transport options were reported with car transport and walking emerging as the dominant modes. This was not surprising given the proximity to car parking facilities and walkable lunch destinations.

Interestingly, nobody attending the workshop reported using a bike for transport.

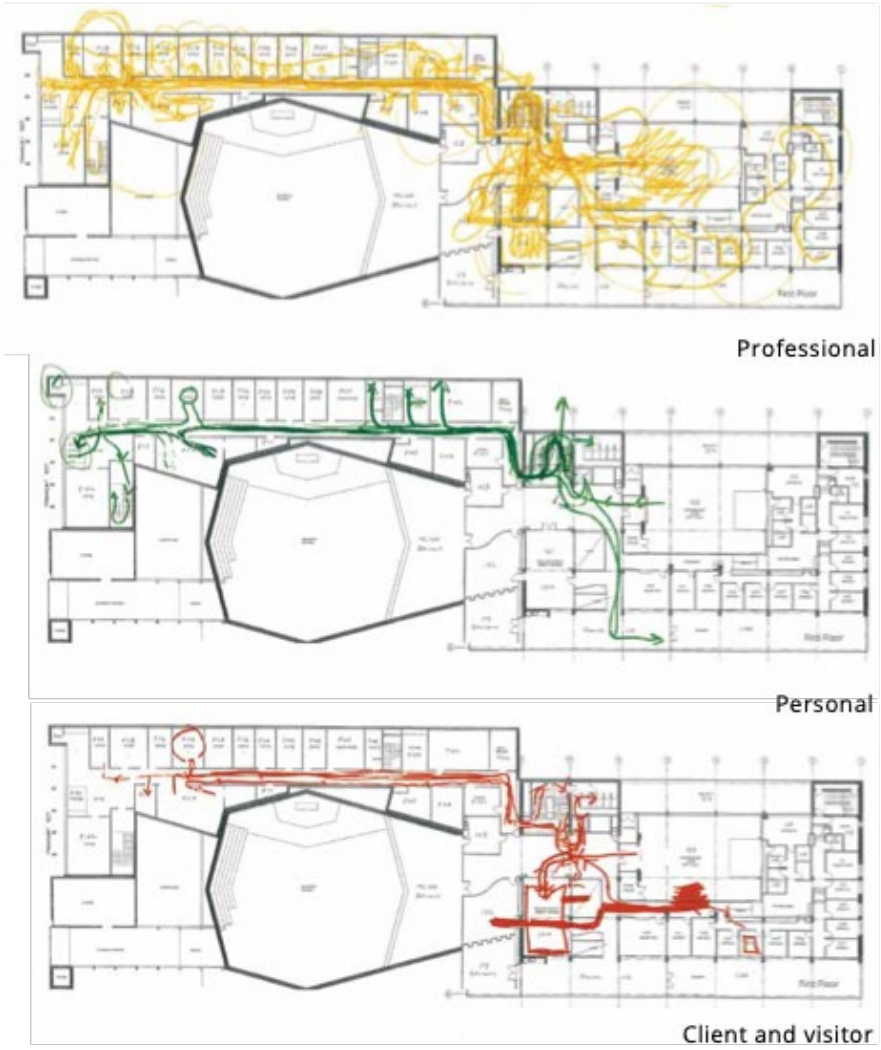
While similar in numbers to bus transport, the Glenelg tram was selected as the most commonly used form of public transport.



Ground floor

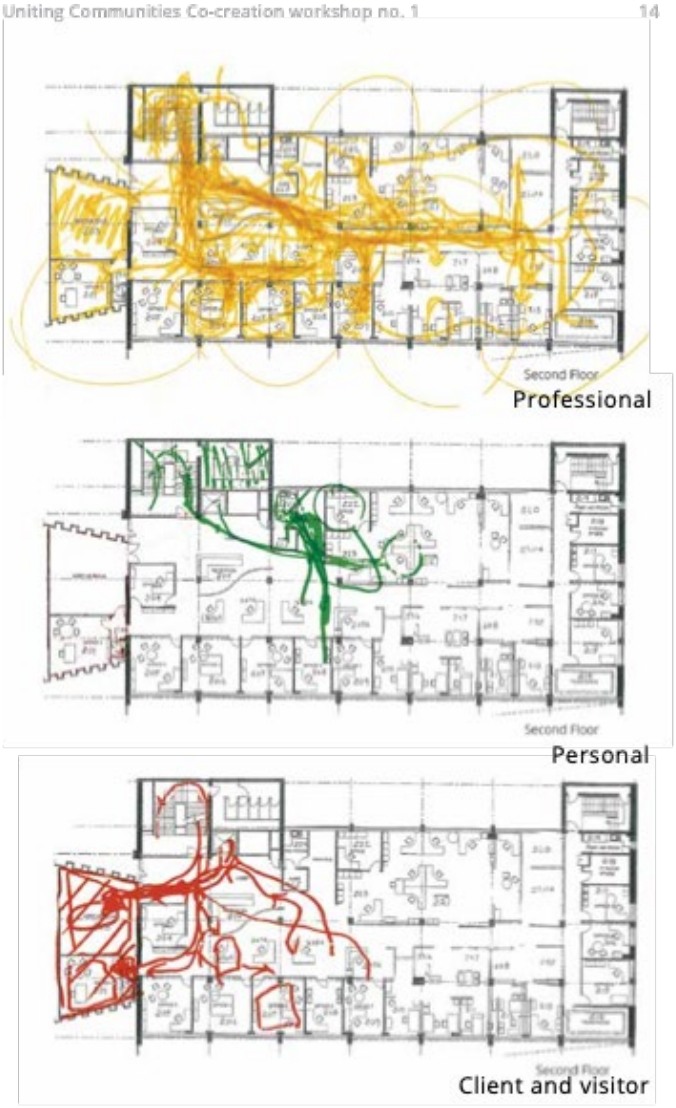
There is significant movement of both staff and clients along the existing eastern corridor. Access is concentrated through the main Pitt Street entry and vertically via the main stairwell for all user groups.

The northern and southern stairwells are not identified as being utilised.



First floor

There is significant movement along the existing eastern corridor by both staff and clients / visitors. There are no spaces identified where incidental interaction can take place and nowhere highlighted as a place to spend personal time.



Second floor

The professional circulation map shows very busy corridors but, as with other floors, no space for incidental interactions.

The tea room and printing room act as a minor hub. Client and visitor access is restricted visually but not physically.







Third floor

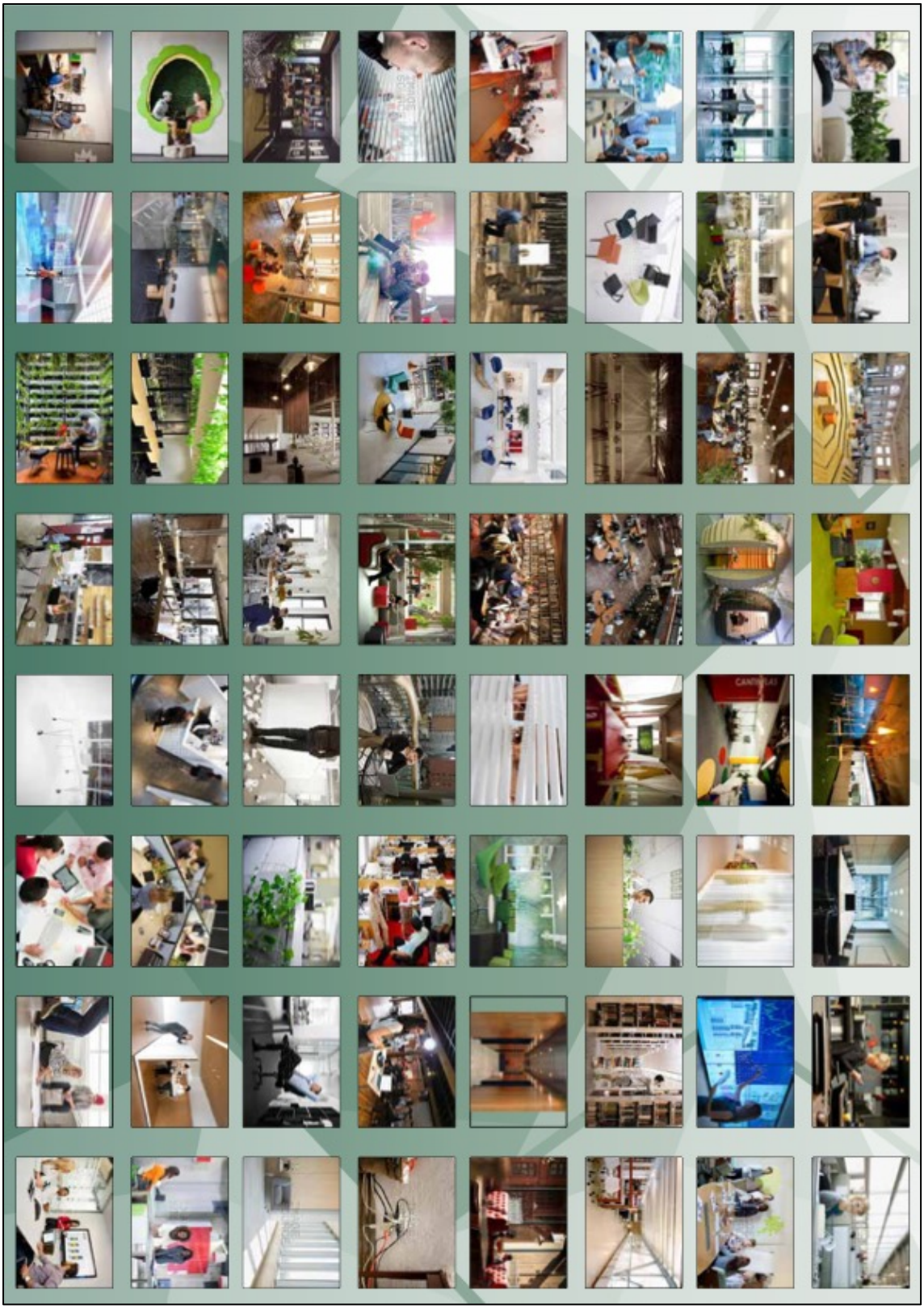
The professional circulation identified is similar to the second floor, with large amounts of movement in corridors with little space for incidental encounters. The kitchen appears to be very under-utilised and the reception desk appears to act as an important control point for client and visitor movements.

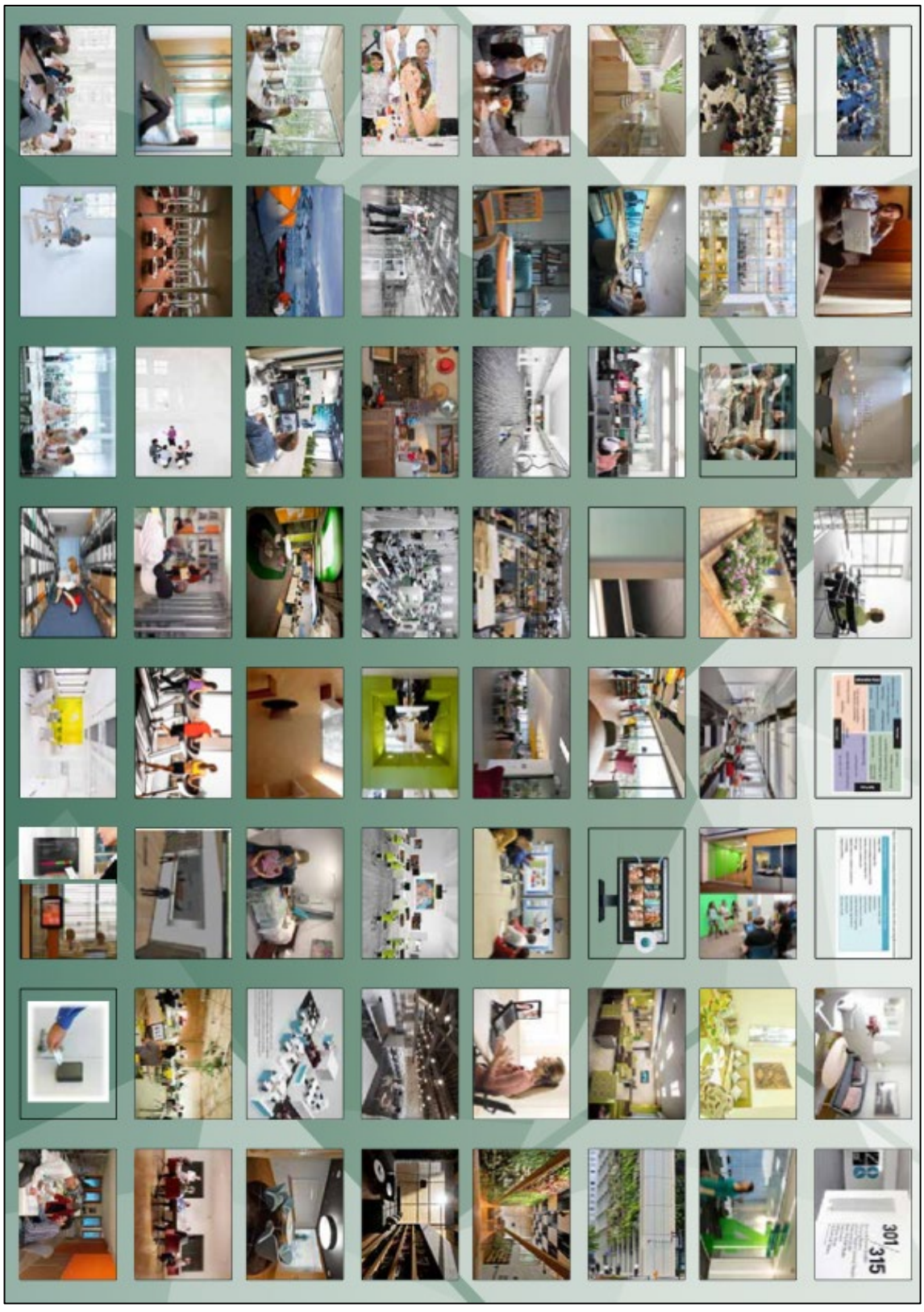
3: Aspirations exercise

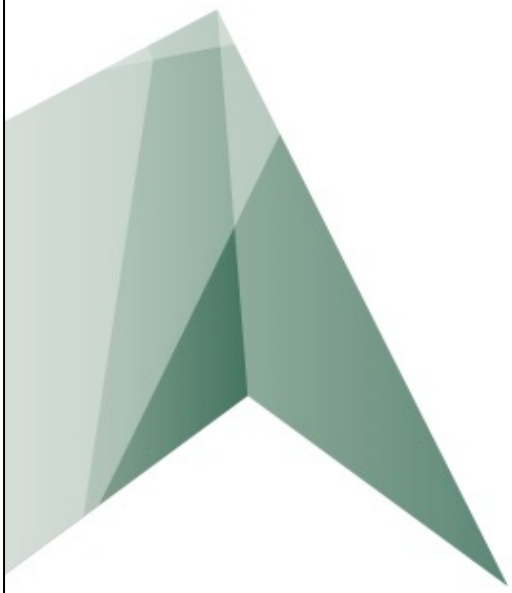
This exercise was an opportunity to start to investigate some of the qualities of space that would best serve the staff and clients of Uniting Communities.

The group were split back into four groups and asked to make some notes on the back of a series of picture cards detailing the positive and negative aspects of each image. Any images submitted by participants for the first exercise that did not feature current Uniting Communities facilities were included in this exercise as well as a series of images selected by the facilitation team.

The groups were again asked to select the five best and worst images to sum up their aspirations for what they believed Uniting Communities should be striving for in a workplace environment.







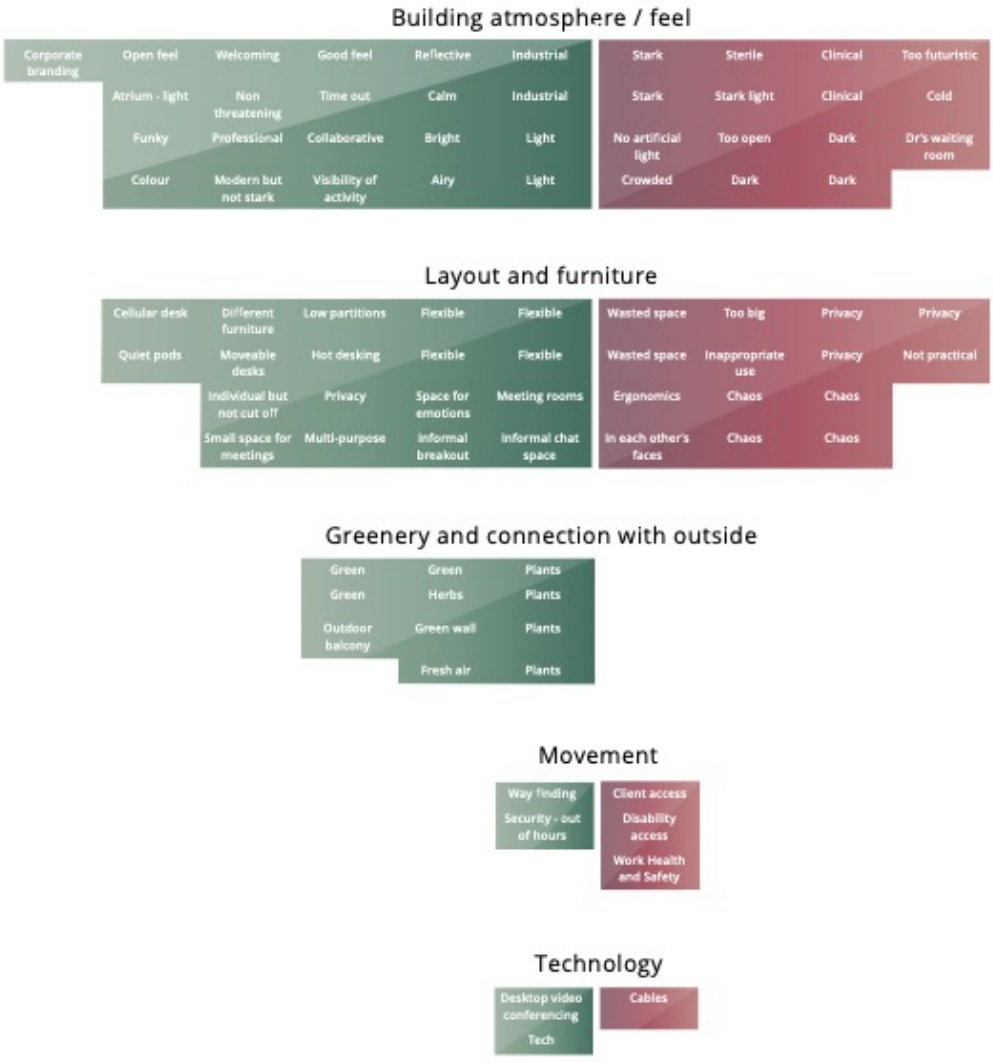
Top five selections

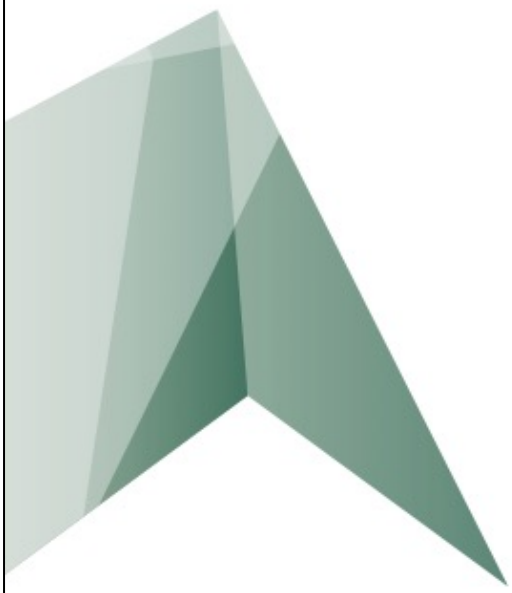
There were five main themes that emerged in this exercise: The atmosphere or feel of the building interior, the internal layout and furniture choice, the inclusion of greenery and a connection with outside, movement through the building, and the integration of technological systems.

In considering the atmosphere or feel of spaces, there was a lot of discussion about the quality of light. There was also a general preference for images that were contemporary but not stark or clinical.

Flexibility was one of the key ideas highlighted in images relating to layout and furniture. There was a fine line however between images being flexible and becoming chaotic or impacting on privacy.

There was a generally positive reaction to images featuring green spaces and a generally negative reaction to images that would compromise universal access.


Building atmosphere / feel
Corporate branding
Open feel
Welcoming
Good feel
Reflective
Industrial
Atrium - light
Non threatening
Time out
Calm
Industrial
Funky
Professional
Collaborative
Bright
Light
Colour
Modern but not stark
Visibility of activity
Airy
Light
Stark
Sterile
Clinical
Too futuristic
Stark
Stark light
Clinical
Cold
No artificial light
Too open
Dark
Dr's waiting room
Crowded
Dark
Dark
Layout and furniture
Cellular desk
Different furniture
Low partitions
Flexible
Flexible
Quiet pods
Moveable desks
Hot desking
Flexible
Flexible
Individual but not cut off
Privacy
Space for emotions
Meeting rooms
Small space for meetings
Multi-purpose
Informal breakout
Informal chat space
Wasted space
Too big
Privacy
Privacy
Wasted space
Inappropriate use
Privacy
Not practical
Ergonomics
Chaos
Chaos
In each other's faces
Chaos
Chaos
Greenery and connection with outside
Green
Green
Plants
Green
Herbs
Plants
Outdoor balcony
Green wall
Plants
Fresh air
Plants
Movement
Way finding
Security - out of hours
Client access
Disability access
Work Health and Safety
Technology
Desktop video conferencing
Tech
Cables



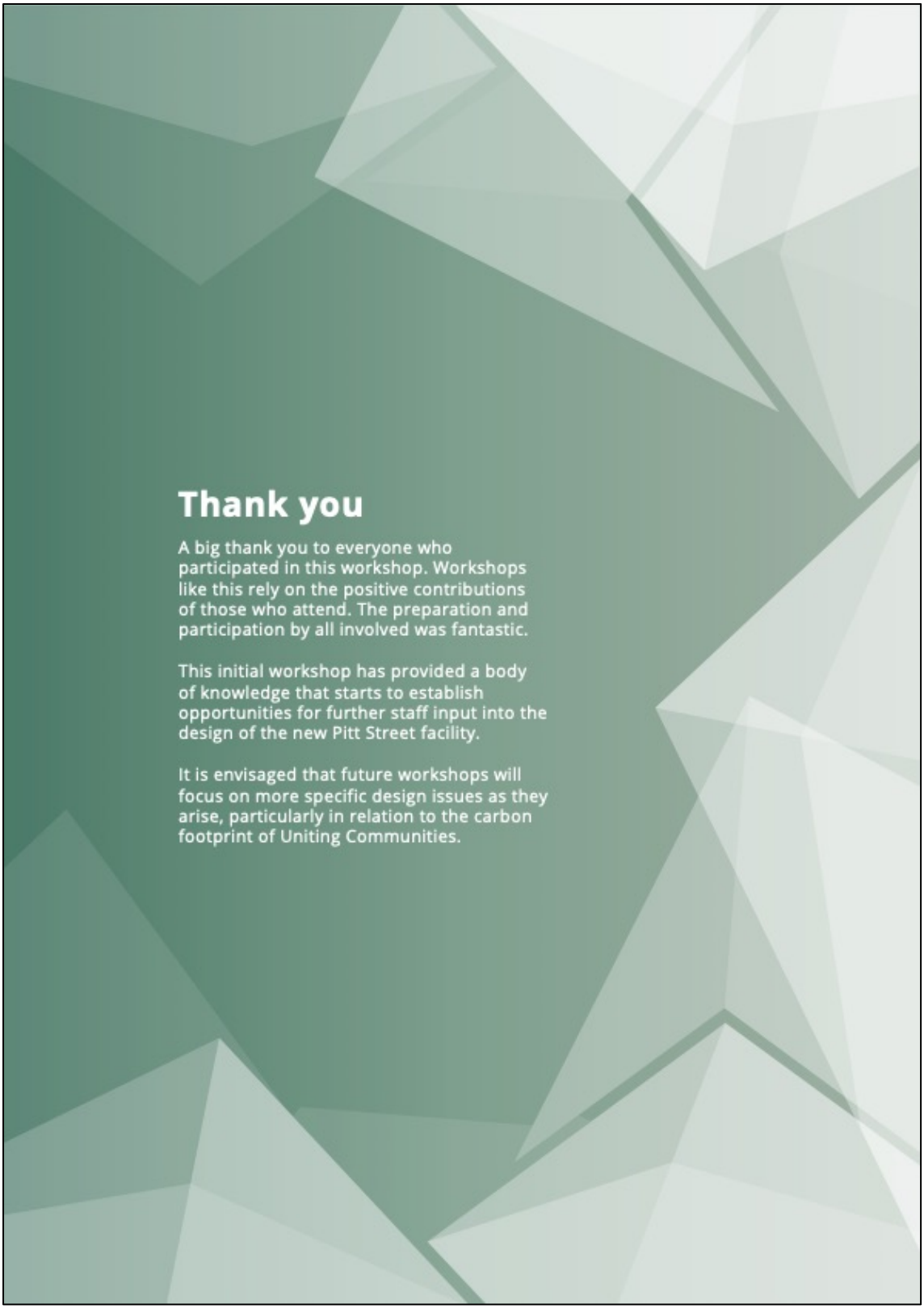
Combined analysis

The combined set builds from the information presented to again present a picture of the kinds of spaces that those present believe represent Uniting Communities.

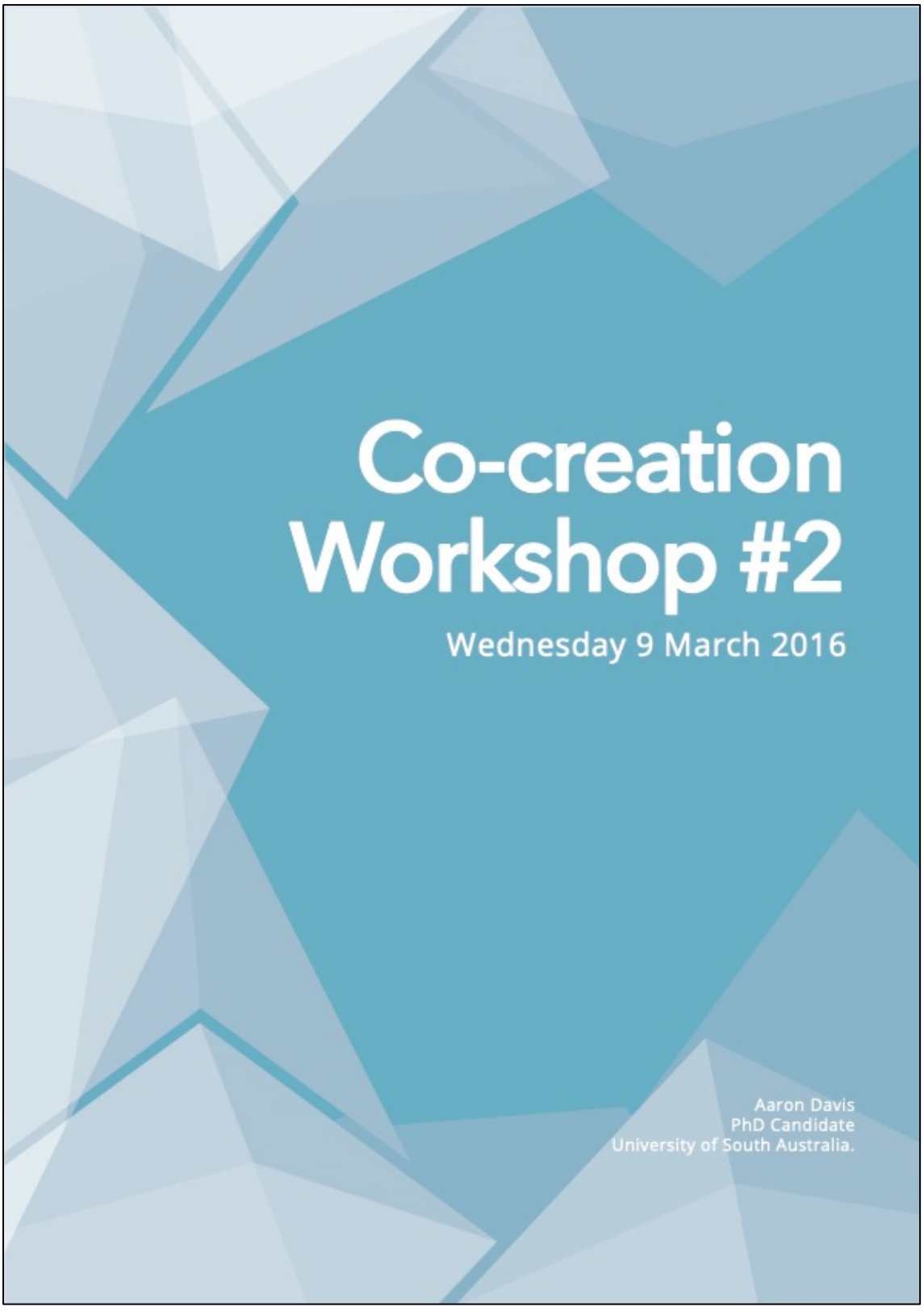
There appears to be some contradiction in the keywords, however this highlights the fact that the Uniting Communities building will need to house a lot of different programs for a lot of different user groups and staff groups.

This PDF is zoomable so please take the time to zoom in and look at some of the themes and contradictions that are starting to emerge in this information.


Aaron Davis
Uniting Communities Co-creation workshop no. 1
22
Building atmosphere / feel
Layout and furniture
Greenery and connection with outside
Technology
Movement


Thank you
A big thank you to everyone who participated in this workshop. Workshops like this rely on the positive contributions of those who attend. The preparation and participation by all involved was fantastic.
This initial workshop has provided a body of knowledge that starts to establish opportunities for further staff input into the design of the new Pitt Street facility.
It is envisaged that future workshops will focus on more specific design issues as they arise, particularly in relation to the carbon footprint of Uniting Communities.

Appendix B.2: U City Workshop Two Report



About the workshop

This workshop was the second in a series of workshops planned with Uniting Communities to investigate whether co-creation tools and strategies can be applied to facilitate projects in the built environment.

This series is being run as a part of a PhD research project at the University of South Australia.

This workshop had 11 participants, including a participant representing the project management consultants and a participant from the architecture firm that has been engaged by Uniting Communities for this project.

The focus of this workshop was on client services delivery. Participants were selected by Uniting Communities senior management on the basis that they were able to represent a broad cross section of the Uniting Communities staff and client groups in this area.

Key takeaways

There were a number of key points made during this workshop.

- It was already well understood that Uniting Communities has a very diverse client group, but this workshop highlighted the fact that these groups have very conflicting needs. This means that shared spaces are not necessarily going to be practical or possible for many client groups.

- Circulation into and around the building is a tremendously complex issue with different client groups requiring different approaches. For many of Uniting Communities' clients, navigation is not only about making it easy to find their way through the building, but also about controlling the number of steps they need to take in order to reach their destination.

- There are a number of extra service requirements that need to be included on the ground floor. These spaces are required by a variety of services and it is impractical to locate them elsewhere in the building.

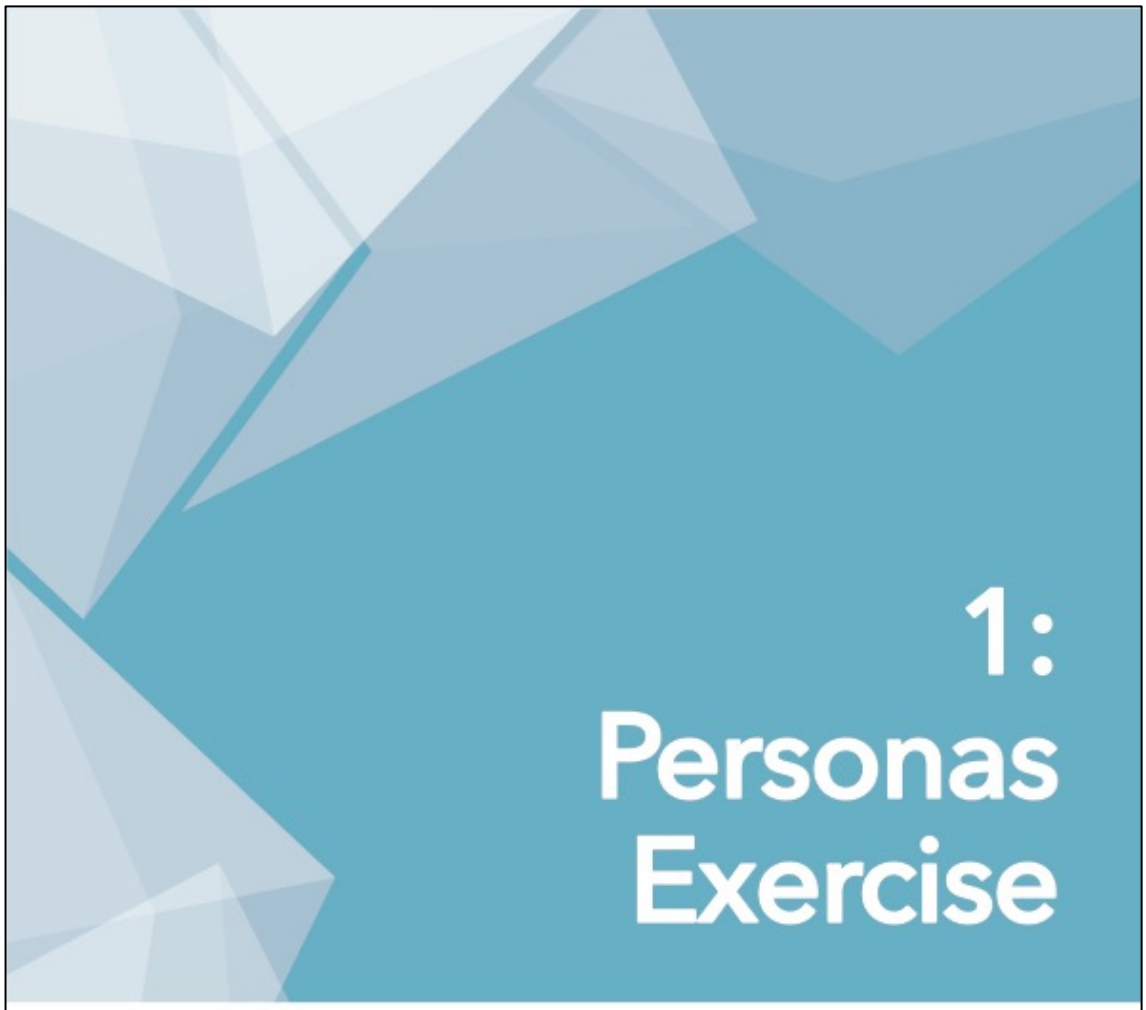


Contents

1: Personas exercise 4
Building a picture of the various client groups accessing Uniting Communities' services.

2: Ideas brainstorm 9
Exploring some of the ways in which the needs of Uniting Communities client groups might be met.

3: Iterations exercise 13
Giving more detail to how some of the key ideas generated by the group might be realised.



1: Personas Exercise

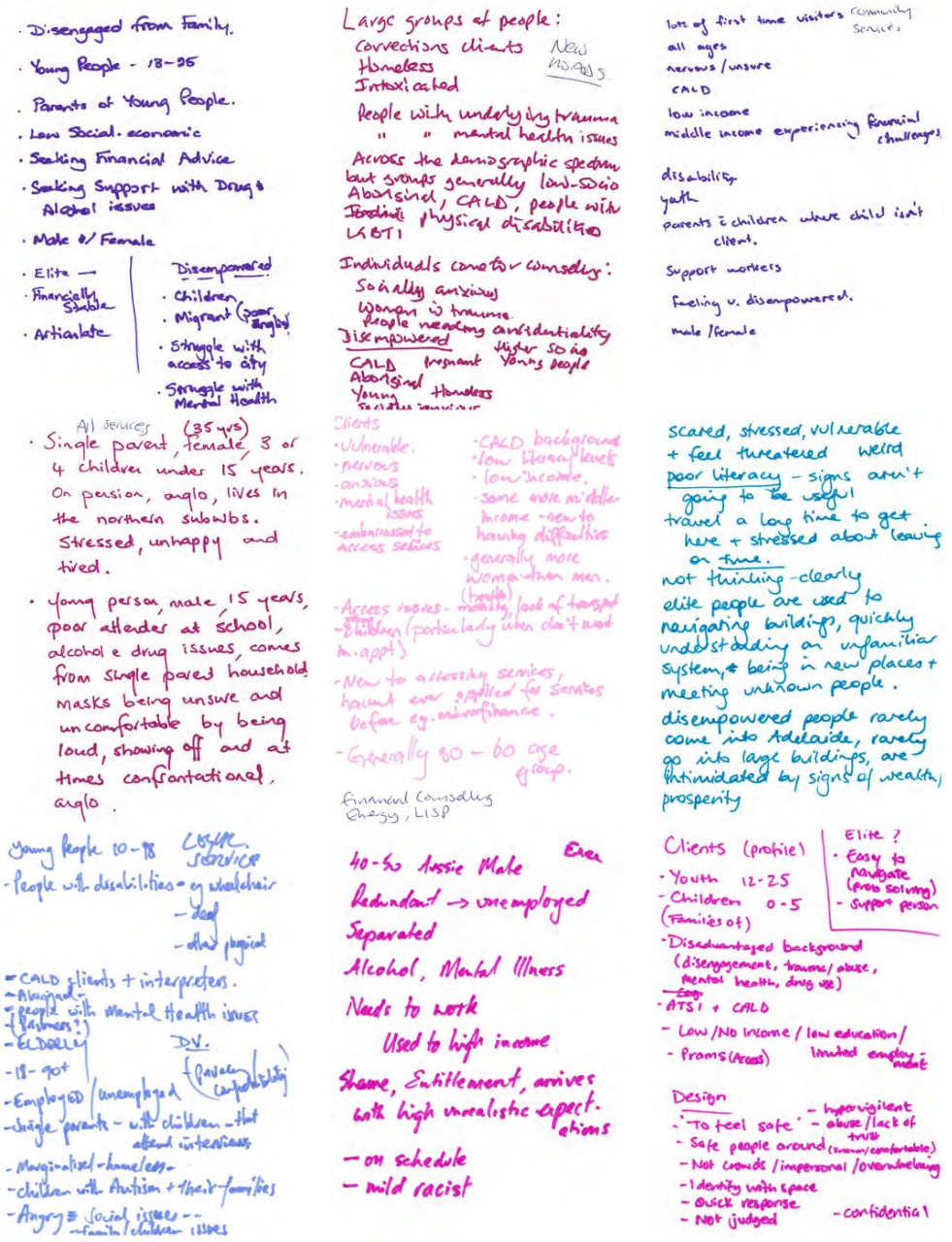
Uniting Communities has a very diverse client group. The first exercise in this workshop was designed to explore some of the specific details about these clients that might have an impact on the way services are delivered, and the way the new building will function.

This exercise used a variation of the Identity, Power and Politics framework developed by design firm IDEO to prompt explorations of issues around race & ethnicity, gender, class & income, the elite, and the disempowered.

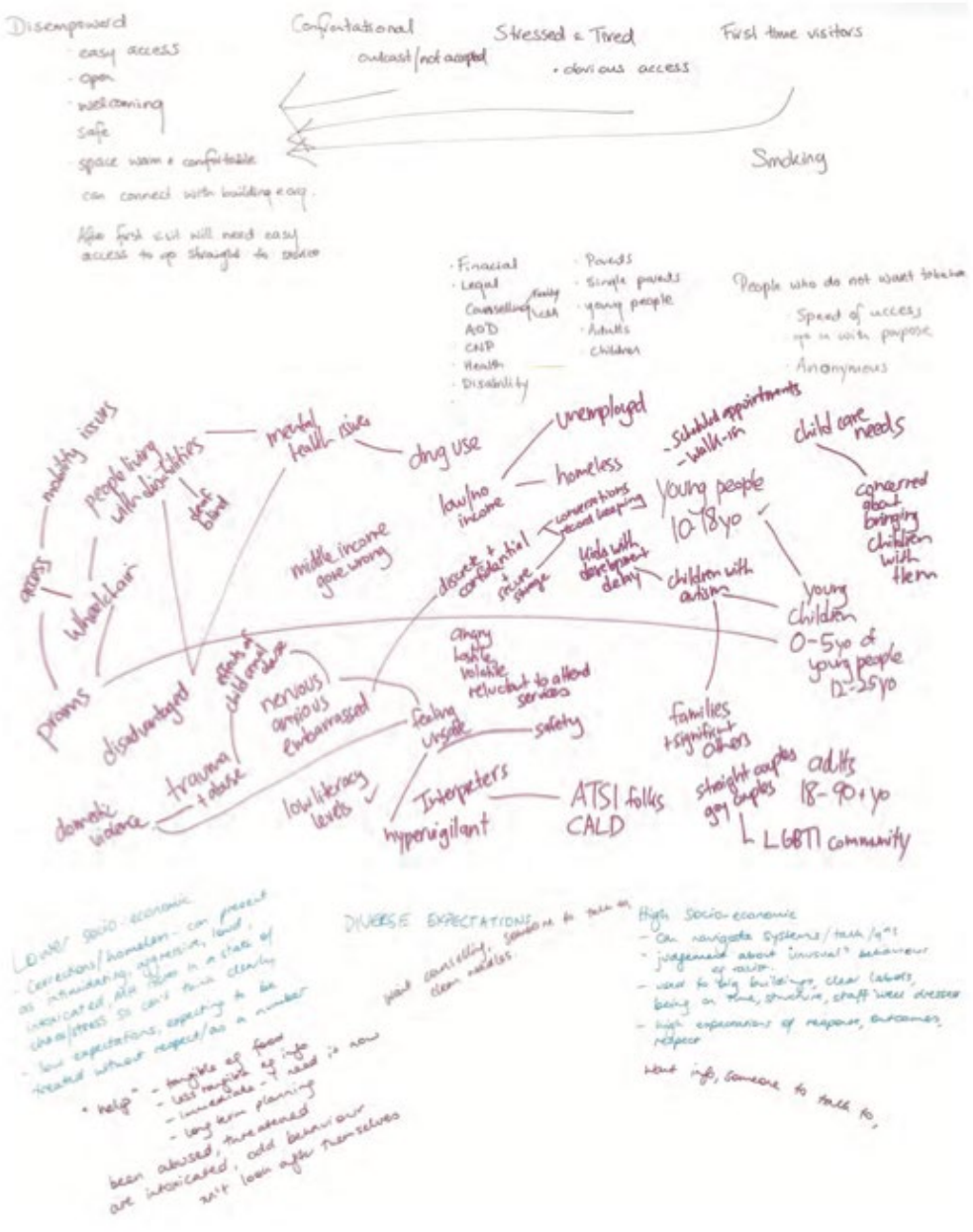
While the list that came out of this exercise may not encompass all of Uniting Communities' clients, it gives an insight into some of the tensions that may emerge, particularly as new services co-habitate for the first time in the new Uniting Communities building.

A copy of the outcomes from this exercises is presented on the next two pages, followed by a summary of their contents.

Individual persona sheets



Group persona sheets (combined)



Age

'All ages'	18 - 25
0-5	18 - 90+
10-18	30 - 60
12 - 25	35
15	40 - 50

Gender and cultural background

Male
Female
LGBTI
Aboriginal People
Torres Straight Islander
Culturally and Linguistically Diverse
Migrants with poor English
Anglo

Value:

Confidentiality
Privacy
Safety
Quick response
Discretion
On-schedule
Structure
Good presentation
Clear labels
Respect
Outcomes
Response
Speed of access
Anonymity
Ease of access

Presenting with

Alcohol and drug issues
Underlying trauma
Underlying mental health issues
Women in trauma
Domestic violence
People struggling with mental health
Effects of child sexual abuse

Economic background

No income
Low income
Financially stable
Receiving a pension
Middle income with financial stress
Low socio-economic status
Middle income
Employed
Unemployed
Redundant
People used to high incomes

Seeking:

Financial advice
Support with drug and alcohol issues
Counselling services
Health services
Walk-in service
Food
Information
Immediate help
Long term planning
Clean needles

People attending:
Young people
Elderly
Separated
Disengaged from family
Corrections clients
Homeless clients
Parents of young people
Children
Youth
Single parents
People from a single parent household
Other support workers e.g. Interpreters
People with low education levels
Kids with poor school attendance
Kids with developmental delays
Parents with children (where children isn't client)
Multiple children under 15 years
Families of clients
Children with autism
Intoxicated persons
Pregnant clients
People with disabilities
People with mobility issues
People in wheelchairs
People with other physical impairments
Prams
People who are deaf
People with poor literacy
Struggle to access the city
Live in northern suburbs
First time visitors
'Inexperienced' clients
People who are blind

Behaviours displayed
Articulate
Vulnerable
Loud and showing off
Confrontational
Tired
Stressed
Unhappy
Socially anxious
Nervous
Unsure
Embarrassed
Scared
Feeling threatened
Feeling weird
Not thinking clearly
Intimidated
Intimidated by wealth / prosperity
Angry
Shame
Entitlement
Anxious
Unrealistic expectations
Racist
Loud
No crowds
Not trusting
Abusive
Hyper-vigilant
Volatile
In a state of chaos
Low expectations
Expecting just to be treated as a number
Judgemental of unusual behaviours

2: Ideas Brainstorm

The second exercise asked participants to respond to some of the characteristics identified in the personas exercise by coming up with ideas for ways these challenges could be addressed.

In the first stage wild ideas were encouraged so that concepts could later be identified that demonstrate how a particular challenge might be addressed. For example, the provision of a basketball court and pinball machine suggest that an element of fun and physical activity would be useful in addressing some clients' needs.

After an initial brainstorm, ideas were grouped into themes. From these themes, more ideas were generated that explored more possibilities for addressing these challenges.

The outcomes of this process are presented on the next page, followed by a summary that combines the three groups' ideas.


Aaron Davis
Uniting Communities Co-creation workshop no. 2
10
Seamless transition
Soft furnishings
Small room
Large courtyard
free tea + coffee + biscuit
outside space
Safety / security
Sound proofing
Crisis response rooms
Space design
Natural light
Video conference links
Rooms with ceramic walls for reading
Fish tank
Lots of colour
Sturdy machine sugar free
Foosball table
pinball machine
interesting funky furniture
bowls of fruit available
Fun stuff
Tea in different shapes + sizes
Storage
Staff room
Kitchen
Meeting room
Reception
Toilets
Outdoor area
Cafe
Cosy
Play area
Children's play space

Welcoming to all

Cosy - not too open
Cafe / "normal space"
Reception areas open, low, not enclosed. Remove barriers
Lots and lots of artwork
Access for community to view art
Access for clients to exhibit art
Coffee, tea facilities available for clients in waiting areas
Children's play space
Free tea + coffee + a biscuit + a comfy seat
Art - Aboriginal clients' work? History of organisation.
Calm music.
Flowers
Comfy chairs
Resources in different languages (signage, flyers etc.)
An air of welcoming hospitality

Technology

Rooms with cameras / microphones for recording
Video conference links
Skype room
Free WiFi
Rooms for Skype
Phone access and mobile charging stations for clients
Rooms with one-way mirrors for family therapy

Extra building programs

'Men's Shed' open to all genders
Rooftop garden available for clients and staff
Smoking area?
Large courtyard coffee n chat space (smoking?)

Fun stuff

TVs with different channels playing
8 Ball table
Bowls of fruit available
Interesting / funky furniture
Lots of colour, vibrant (not hospital looking)
Lots of interesting reading materials
Free coffee
Open retail / cafe, spreading out in open area
ATM
X-box / playstation area. Games arcade
Half court basketball space
Slushy machine (sugar free)
Pinball machine
Foxtel AFL
Massage chairs

Navigation

The same room I was in last time (with the same person)
Easily identifiable (I don't want to think / ask questions)
Channelling people
Safe exit that is not back through waiting area / public space
Arrows, footsteps, patterns, colours
Shapes / lines / colour to identify directions. Not words
Skilled staff to recognise and respond to needs quickly
Seamless transition
Themes / consistency
Known point of contact at reception (not impersonal)
Quick response

Aboriginal Issues

There may be some specific issues around access

Space layout / design

Able to open windows
Comfortable air temperature
Outside space
Tucked away waiting chairs, not visible from entry point
Soft, inviting, waiting chairs
Taller / hard chairs - easy for people to sit in and get up from
Equity of access for wheelchair users and people with special needs
Alcohol and Drug reception on ground floor for clean needle program and intoxicated clients.
Room off of reception for residential clients to turn up with belongings.
Quiet 'triage' space on ground floor.
Sitting / resting places rather than shops that require a purchase.
Old fashioned, no clear, clean services, no glass (makes me visible)
Earthy rather than corporate. Exposed brick, plants, wood colour, texture.
Something that looks like my place / house.
Some people don't like to sit where people can see you.
Crisis response rooms.
Private waiting areas.
Short term storage area for client goods.
Clean needle program.
Counselling rooms next to reception (main reception + local reception).
Natural light
Ambulance access.
Different waiting areas with different 'feels' including music.
Easy parking (disabled parking also)
Fun and colourful waiting room (youth + children)
Vibrant and busy spaces + Private spaces.
Nurturing space
Custom designed rooms i.e. clinic rooms.
Community space
Meeting rooms

Safety / security / confidentiality

Comfortable semi-private space - not enclosed where staff can meet with distressed clients
Safe space to defuse confrontation
Any security is invisible i.e. 'I don't see the places I can't go'
Small room for waiting (enclosed)
Private - I'm the only one here / this service is just for people like me.
You don't have to talk to anyone except your worker.
Quiet. No loud noises / unexpected noises.
Can't hear details, can hear raised voices.
Sound proofing
Security (guard?)
Private telephones (staff access) for confidential calls
Having people around
People have a real concern others can hear / overhead their matter. So, confidential rooms.

3: Iterations exercise

After developing a large number of ideas, the group at the workshop shared these with each other then set about choosing an idea that they thought had merit, and that they could help to refine.

Participants were given a single sheet of paper to describe how the idea might be translated into a real space, facility or service within the new Uniting Communities building.

After completing this initial description, participants were asked to represent their idea in another way e.g. through flow charts, prose, or pictorially. This iteration then led to a third iteration of the idea and a presentation back to the group.

The ideas ranged from practical design strategies to descriptions of how visitors might be guided to the appropriate Uniting Communities services.

These ideas are summarised on a table on the next page, then presented in full on the following pages.

Security - general access

Separate connection for clients to go between the two levels of service delivery. Secure staff access from offices above to get down into client services spaces. Staff access discrete and not visible to clients.

Confidentiality

Comfortable area for clients but also a safe area - safe for clients and staff. Some areas appear 'open' but confidential and discrete. Perhaps opaque wall so movement can be seen, but privacy maintained.

Navigation - Entry foyer

Coordinating meet and greet, triage, and response in entry foyer. Reception staff / receivers to have diverse and complete training. Entry functioning as a 'dwelling' space where people are channelled out to the points of the building where they need to go.

Navigation into and around UC

A key feature on the facade that makes the building easy to find. Easy navigation through the building with an obvious entrance, cues that staff can describe to clients over the phone e.g. 'follow the red lines, they will bring you right to me'. For new clients / walk ins, a friendly face that takes them right through their experience of UC.

Navigation - Meet and greet process

Triage' attitude with streamlined access. 'Worker on duty' to see to walk-in presentations for immediate needs assessment. 1-2 steps to access what you need instead of hand balling between departments.

Non-traditional waiting areas

A fun waiting space where people can do things rather than just sitting and waiting. Possibly a double function space that can be used for meetings etc. at some times, and a fun waiting space at others.

Spaces - Waiting facilities

Waiting area with 'tucked away' corners for people to wait in that are still visible from reception. Reception desk to have capacity for extra support to be given from a person that is out-of-sight.

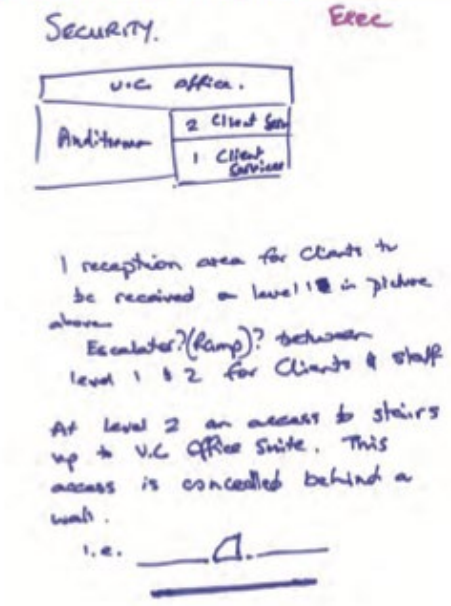
Crisis response - reception

Separated small reception area with drug and alcohol staff. Counselling room nearby where clients can be immediately taken when intoxicated or drug affected. Calming atmosphere while waiting for ambulance, taxi etc.

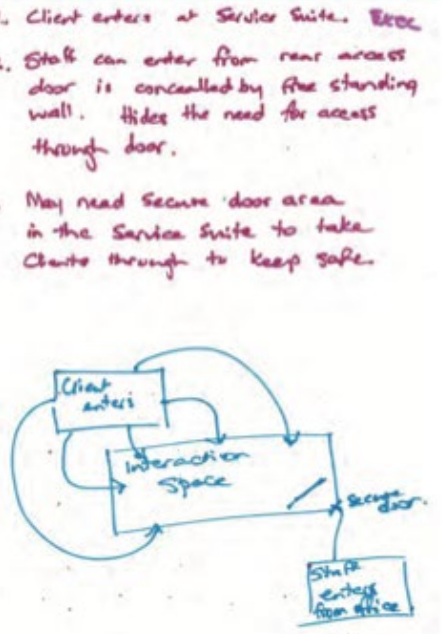
Security - service delivery spaces

Client and service staff enter interaction space / service delivery space from separated entry points. Staff have secure entry point from office.

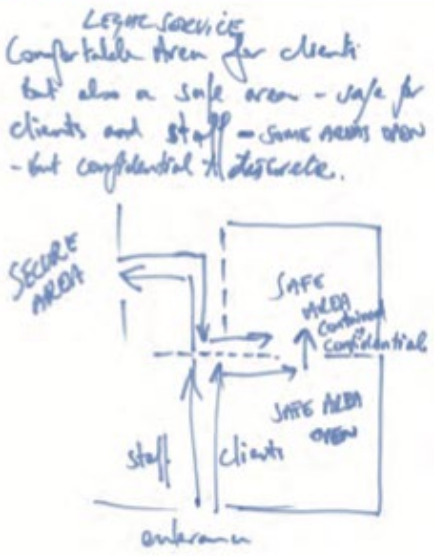
Security - general access



Security - service delivery spaces

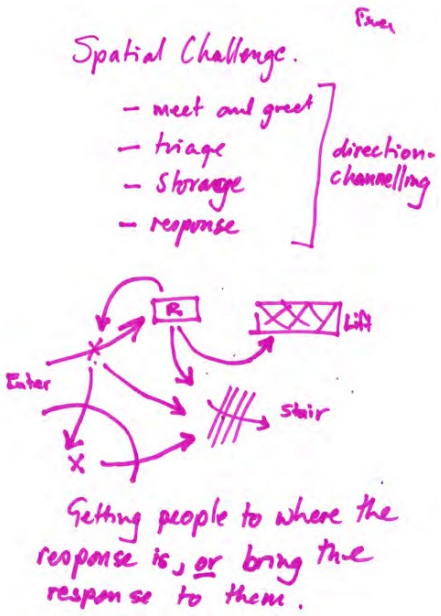


Confidentiality



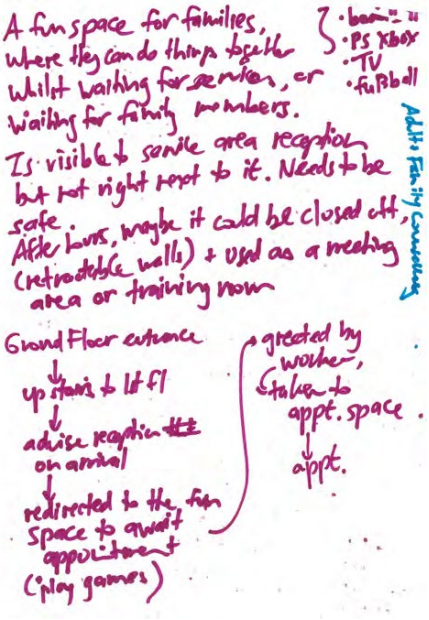


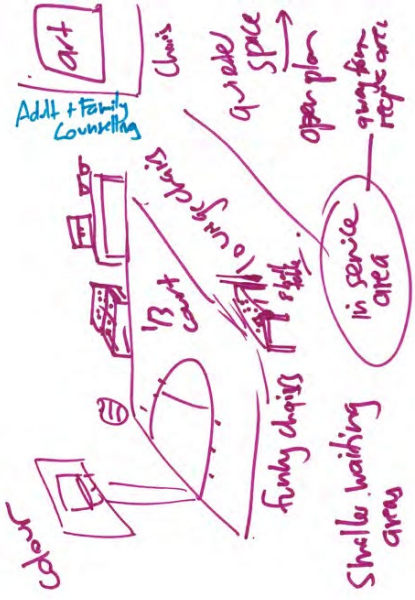
Navigation - Entry foyer



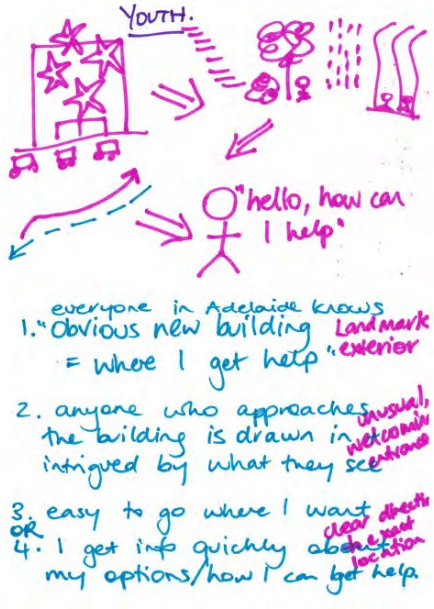


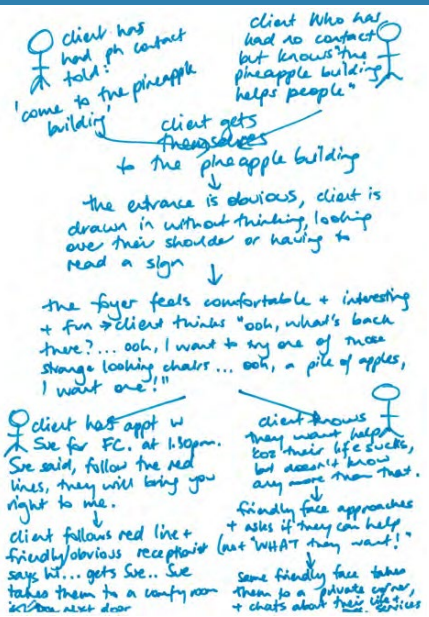
Non-traditional waiting areas



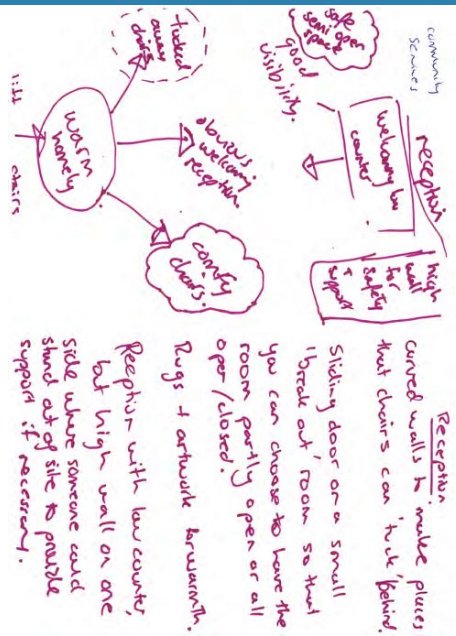


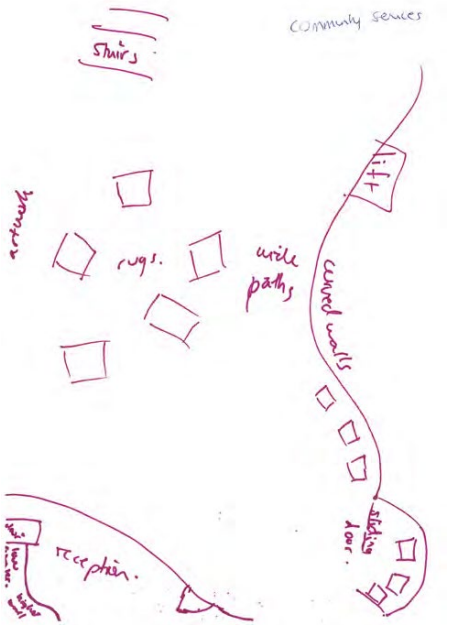
Navigation into and around UC





Spaces - Waiting facilities





Crisis response - reception

Crisis response. New KOADS

Untreated mental health/suicidal, and/or intoxicated, challenging behaviours:

Immediate response perhaps by floorwalker who would alert AOD (alcohol other drugs) worker to support:

Smaller reception area with AOD receptionist + counselling room, always staffed, behind it. Duty type room perhaps.

This set up would allow client to receive immediate treatment + facilitate ambulance, cab home etc. Also allows worker to provide safety by doing regular OBC's

Space should be less stimulating, earthy, comforting, nurturing, 'contained'

Crisis response New KOADS

1. Client with challenging behaviour, intoxicated, mental health issues etc. presents. Person seeking Urban Needle Program.
2. Floorwalker directs client to AOD reception which is on ground floor
3. AOD reception is smaller, less stimulating space, earthy, nurturing
4. AOD receptionist + AOD staff member base are behind main reception or to the side.

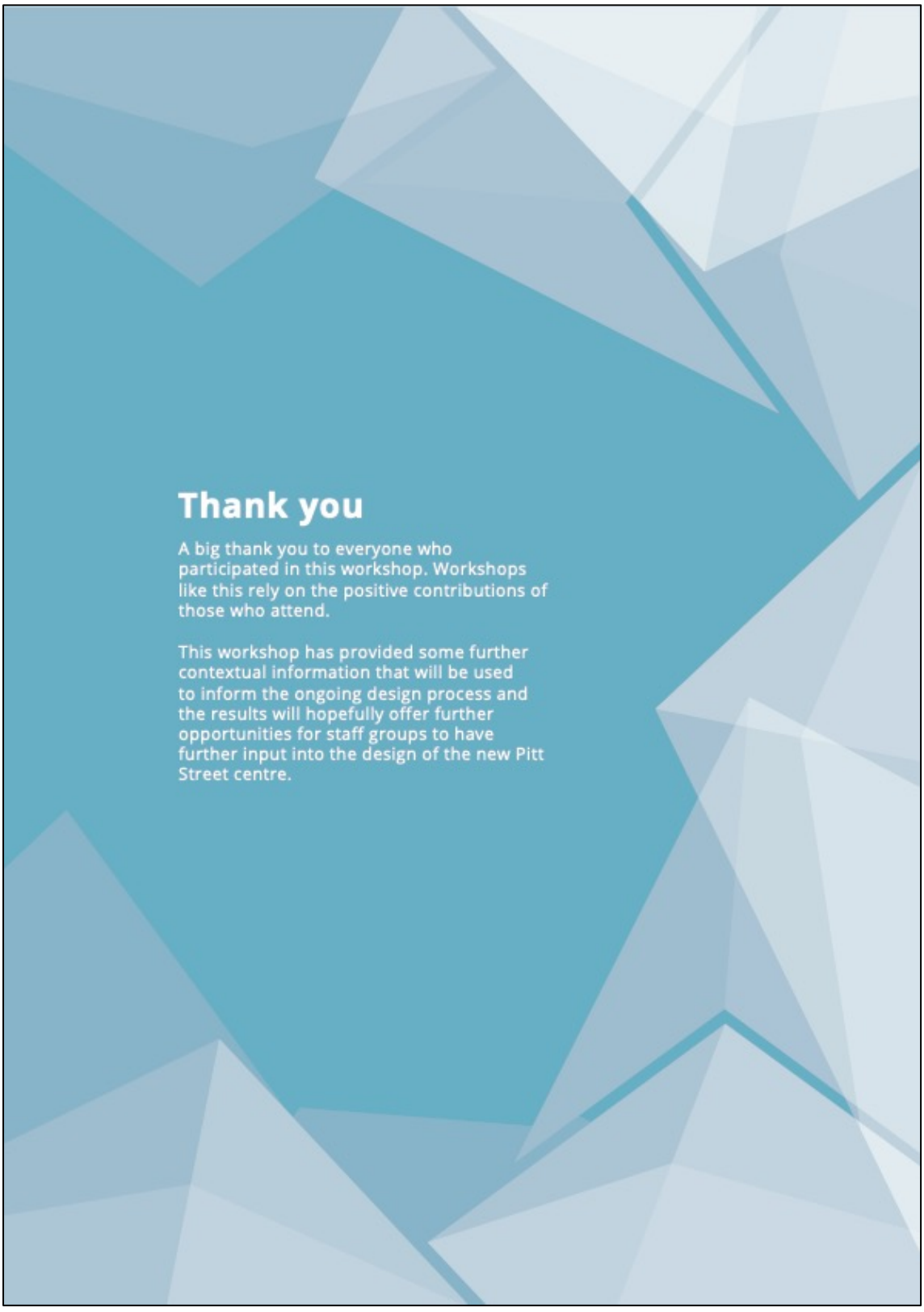


Navigation - Meet and greet process

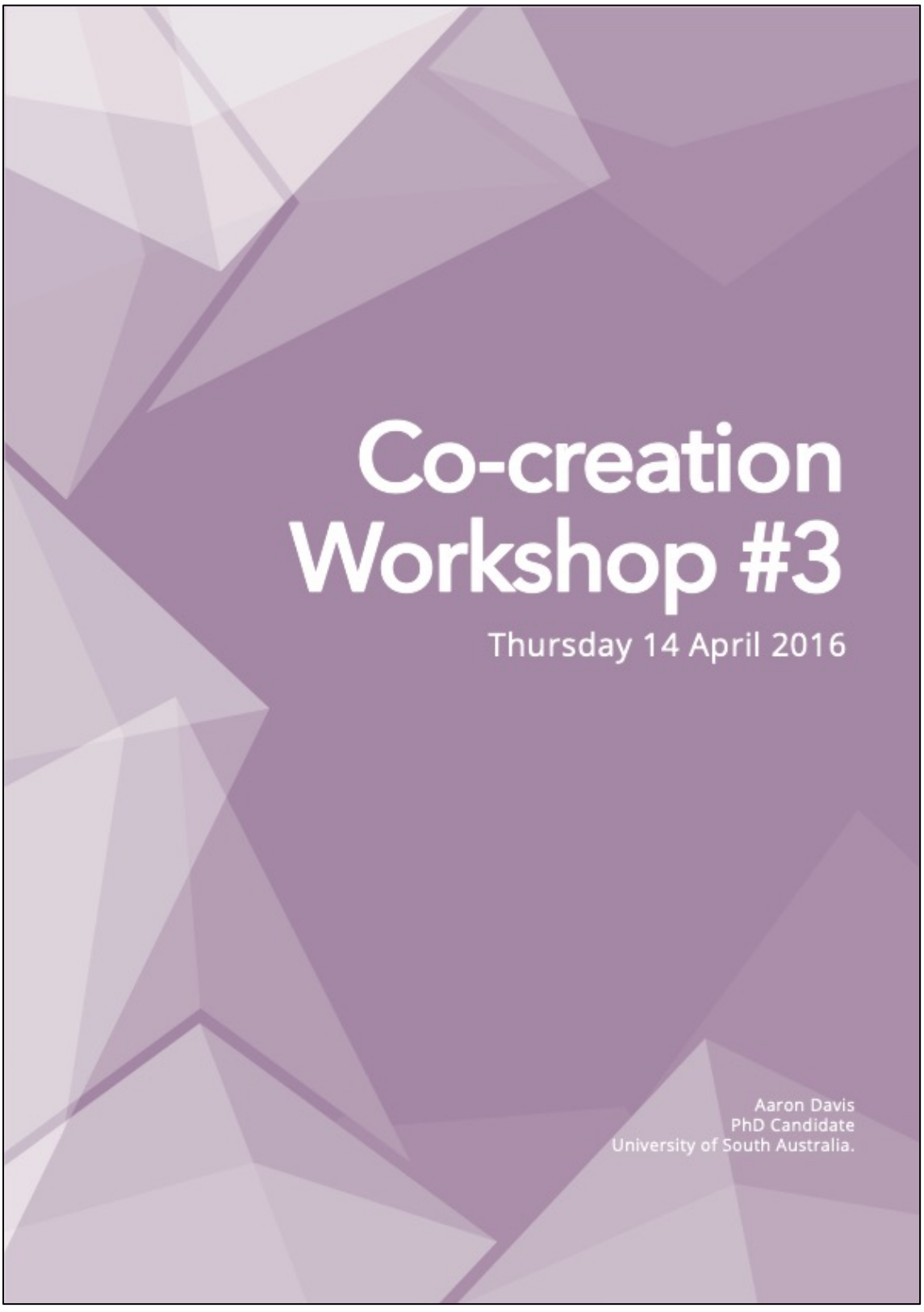
~~Safety / security~~ - manage behaviors - de-escalate - crisis response

Quick response to Clients:
- Go to main reception or directly to service
- Point of contact at service
- Drop in access "worker on duty" to respond to unscheduled presentation
- Counselling space next to main / satellite receptions
- "Triage" attitude (high risk = quick response)
- No wrong door at UC
- Streamlined access 1-2 steps to access what need - no hand balling ...




Thank you
A big thank you to everyone who participated in this workshop. Workshops like this rely on the positive contributions of those who attend.
This workshop has provided some further contextual information that will be used to inform the ongoing design process and the results will hopefully offer further opportunities for staff groups to have further input into the design of the new Pitt Street centre.

Appendix B.3: U City Workshop Three Report



About the workshop

This workshop was the third in a series of workshops planned with Uniting Communities to investigate whether co-creation tools and strategies can be applied to facilitate projects in the built environment.

This series is being run as a part of a PhD research project at the University of South Australia.

This workshop had 12 participants from Uniting Communities, the project management consultants, and one of the architects that is working on the design.

The focus of this workshop was on reviewing the current design of the client services suite.

Participants were selected by Uniting Communities senior management on the basis that they were able to represent a broad cross section of the Uniting Communities staff and client groups in this area.

Key takeaways

There were a number of key points made during this workshop.

- There is a recognition emerging that although there are many different services being accessed, Uniting Communities clients all have very similar needs spatially and the services suite should be able to accommodate this.

- The services suite is going to be a highly utilised space and the way services are delivered is going to have to shift in order to fit in the spatial limits.

- The interaction between the first and second floors will be critical in ensuring the success of the design.

- The homely rather than corporate design appears to be working well at this stage.



Contents

1: Feedback from Uniting Communities Executive 4
Feedback on the executive level response to the outcomes of previous workshops.

2: Staff response to the current design 5
Exploring some of the issues around the ways that staff will utilise the service delivery spaces

3: Client based response to the current design 8
Exploring the proposed design elements through the lens of end-users.

1: Feedback from the UC Executive

The workshop started with an introduction from Simon Schrapel. This outlined the executive's concept for what Uniting Communities is trying to become and how the new building project was helping to support the organisations transition.

Simon described in broad terms the executive's vision for the new building. The key summary of this was that the building will be a place that extends well beyond the traditional 9 - 5 Monday to Friday model, and is made up of four main activities:

1. Selling - The ground floor is about connecting with the broader community through retail, hospitality, and selling Uniting Communities' services to the public.

2. Serving - The first floor(s) of the building will house the spaces where Uniting Communities serves its clients.

3. Working - Above this are spaces where Uniting Communities' organisational staff will work, and commercial office spaces will be created to be leased.

4. Living - The top of the building will feature a broad range of accommodation services, from respite to assisted living units.

2: Feedback: From the staff perspective

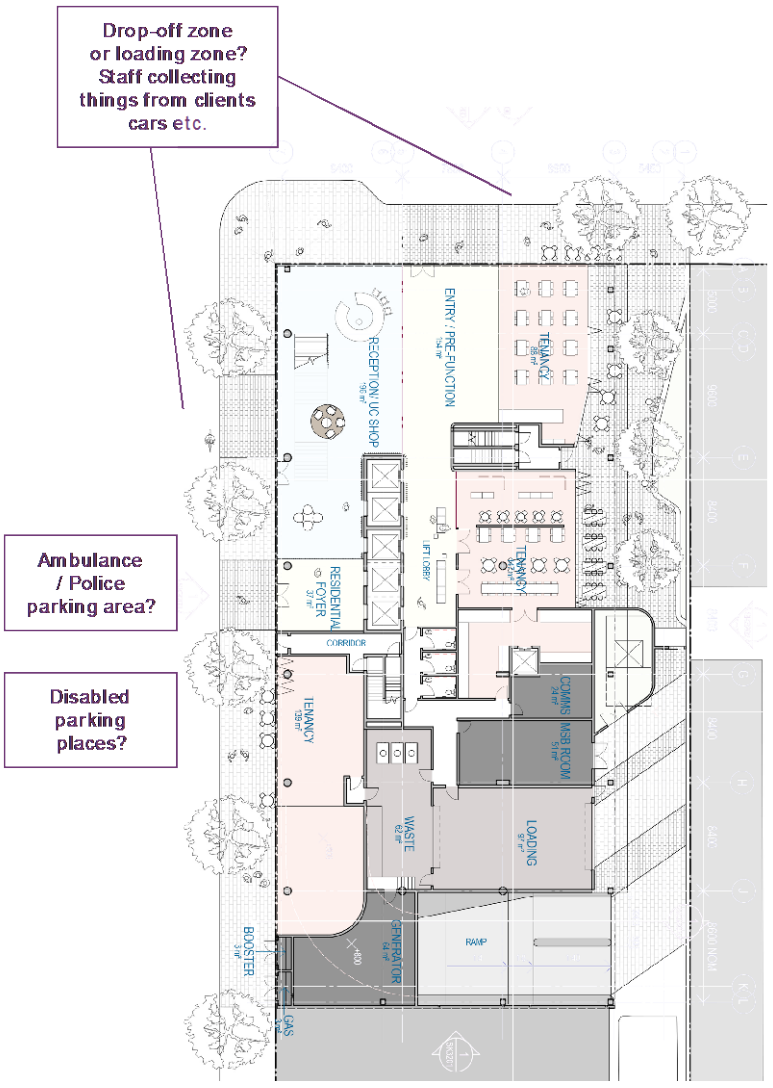
After the introduction from Simon Schrapel, the discussion turned to the specific ways in which the current designs would meet (or not meet) the needs of Uniting Communities' staff.

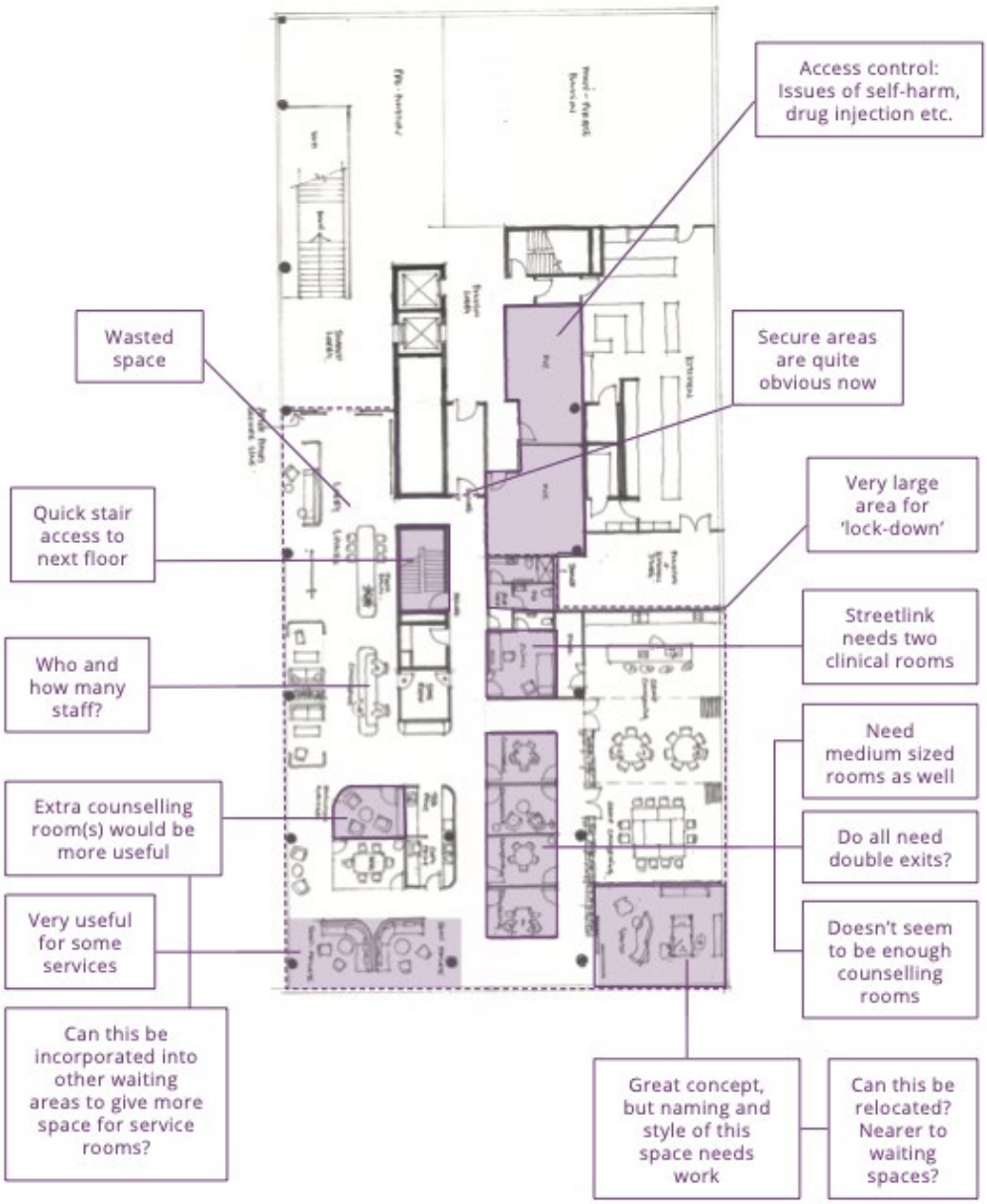
The discussion covered a range of areas but was generally positive about the work that had been done.

The following pages summarise the parts of this discussion that revolved around the ways in which staff might use the spaces on a single ground floor and first floor plan.

There was a general consensus that the ground floor plan would work well given the right change-management programs were undertaken prior to opening the new centre.

The first floor plan was also generally well received from a staff perspective, with the primary concerns being issues that can be managed through improved processes rather than requiring changes in the design of the spaces.


Drop-off zone or loading zone? Staff collecting things from clients cars etc.
Ambulance / Police parking area?
Disabled parking places?
RECEPTION/ UC SHOP
ENTRY / PRE-FUNCTION
TENANCY
RESIDENTIAL FOYER
LIFT LOBBY
CORRIDOR
TENANCY
COMMS
MSB ROOM
WASTE
LOADING
RAMP
BOOSTER
GENERATOR
GAS


Access control: Issues of self-harm, drug injection etc.
Wasted space
Secure areas are quite obvious now
Quick stair access to next floor
Very large area for 'lock-down'
Streetlink needs two clinical rooms
Who and how many staff?
Need medium sized rooms as well
Extra counselling room(s) would be more useful
Do all need double exits?
Very useful for some services
Doesn't seem to be enough counselling rooms
Can this be incorporated into other waiting areas to give more space for service rooms?
Great concept, but naming and style of this space needs work
Can this be relocated? Nearer to waiting spaces?

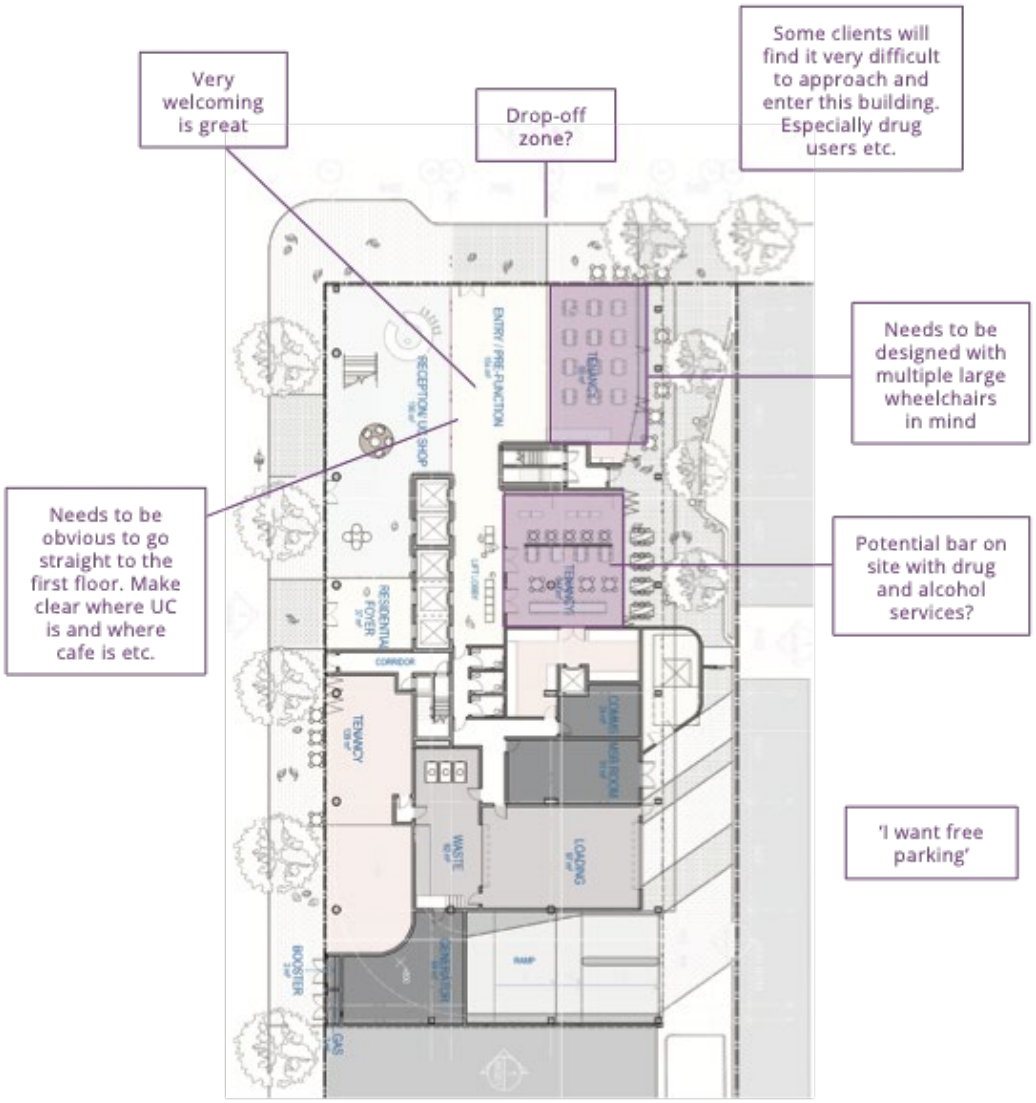
3: Feedback: From the client's perspective

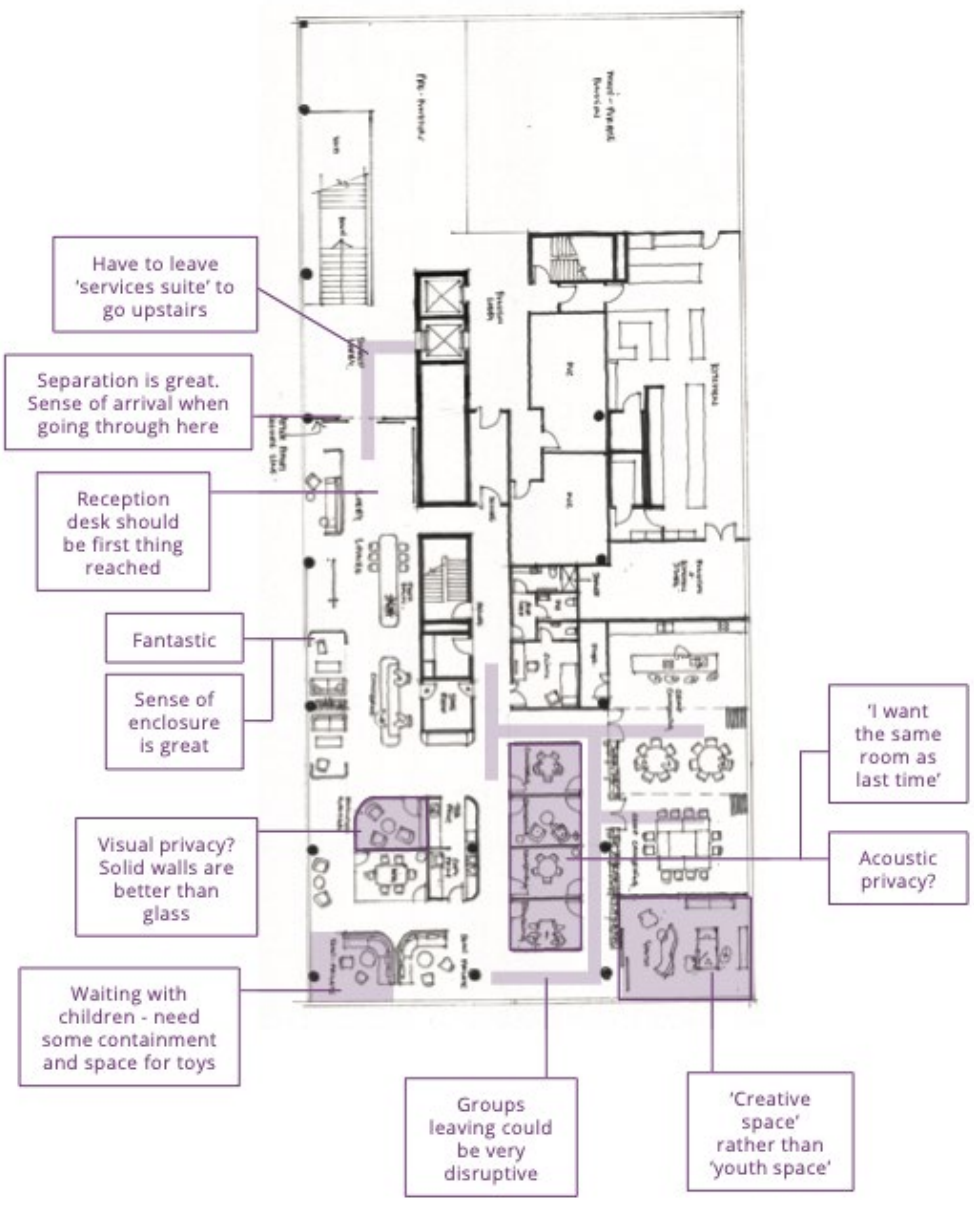
For the final part of the session, participants were asked to consider the current design from the perspective of the clients that will be accessing the services.

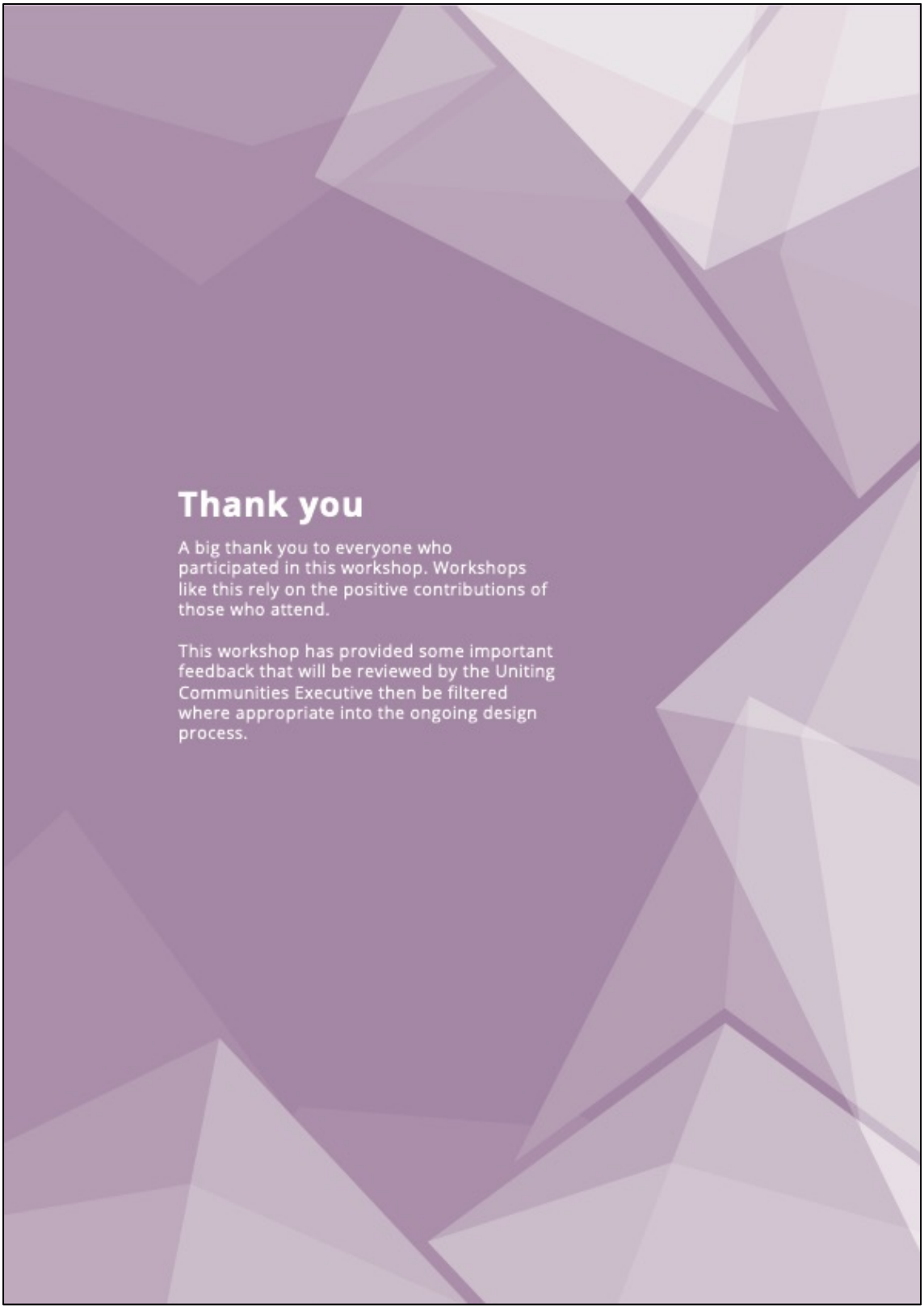
The broad range of client profiles and needs identified in the previous workshop was used to prompt discussion about the ways in which various clients would interact with the proposed spaces.

Feedback has been combined onto a single ground floor and upper floor plan to identify areas that may serve clients well and those that may need some changes made.

As with the staff perspective, most of the feedback was very positive and there were only minor queries about the suitability and arrangement of some of the spaces.


Very welcoming is great
Drop-off zone?
Some clients will find it very difficult to approach and enter this building. Especially drug users etc.
Needs to be designed with multiple large wheelchairs in mind
Needs to be obvious to go straight to the first floor. Make clear where UC is and where cafe is etc.
Potential bar on site with drug and alcohol services?
'I want free parking'
ENTRY / PRE-FUNCTION
RECEPTION / SHOP
TENANCY
RESIDENTIAL FOYER
CORRIDOR
TENANCY
WASTE
LOADING
RAMP
BOOSTER
GAS


Have to leave 'services suite' to go upstairs
Separation is great. Sense of arrival when going through here
Reception desk should be first thing reached
Fantastic
Sense of enclosure is great
Visual privacy? Solid walls are better than glass
Waiting with children - need some containment and space for toys
Groups leaving could be very disruptive
'Creative space' rather than 'youth space'
Acoustic privacy?
'I want the same room as last time'


Thank you
A big thank you to everyone who participated in this workshop. Workshops like this rely on the positive contributions of those who attend.
This workshop has provided some important feedback that will be reviewed by the Uniting Communities Executive then be filtered where appropriate into the ongoing design process.