Designing Smart Urban Furniture for More-Than-Human Stakeholders

Dissertation

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Abstract

The movement towards the world being more sustainable has seen cities as a focus of this area due to their population density. Cities as we know today, the urban environment is designed as a separate space segregated from the natural environment. This design approach is unsustainable for cities to continue as a separate entity.

Smart city solutions have presented themselves as being more efficient and sustainable, using technology to enhance a city's capability. For cities to achieve greater sustainability will require recognition of designing cities as part of the environment. Much of the focus of designing furniture in urban environments is exclusively for human use, with a lack of consideration of non-human stakeholders.

This research investigates how we approach designing smart urban furniture considering non-human and human stakeholders to arrive at a design solution that caters for both stakeholders. In this research, the non-human stakeholders are a selection of native flora that include the Red Spider Flower, Narrowed-leaved Bottlebrush, possums including the common Brushtail and Ringtail, birds and bees that have been chosen to promote a small-scale ecosystem. Human stakeholders have been identified in this research as urban dwellers which include office workers and property owners.

Through Participatory Action Research, we involve human representatives for non-human stakeholders in participatory design workshops to provide each stakeholder with a voice in the design process. An initial design concept based off existing precedence and literature was presented to participants as a foundation for discussion of how we might design smart urban furniture with non-human and human stakeholders to promote a co-existing space. Participants are also provided with non-human personas to communicate the motivations from the perspective of non-human stakeholders.

The discussions from the participatory design workshops have resulted in a design concept which has iterated from feedback that seeks to address the needs of human and non-human stakeholders. This research contributes new knowledge in the form of non-human personas, a design artefact and a design approach to serve as a preliminary framework for designing smart urban furniture that considers non-human and human stakeholders.

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01.0 Introduction

Research Aim
To design smart urban furniture with non-human and human stakeholders to promote a co-existing space.

This dissertation seeks to answer the following research questions:

Research Question 1
How can smart urban furniture be designed for non-human and human stakeholders to reclaim urban spaces and create greener co-existing spaces in urban environments?

Research Question 2
How can participatory methods contribute towards creating a collaborative design approach that involves non-human and human stakeholders?

Cities of the future will play an important role in society as populations increasingly migrate from rural areas into urban areas. In 2050 it is projected that two thirds of the world's population will live in urban areas (Kammen & Sunter, 2016). Urbanisation and population growth have been identified as major contributors to resources shortages and climate change (Singh & Singh, 2019). To accommodate for the urban growth, cities with efficient management of resources will be required to meet the rising demand. Smart city solutions have presented themselves as interventions to address the current inefficiency of cities. The contemporary applications of smart city solutions have come in the form of technological innovation that seek to improve the efficiency of resources consumed in cities as a strategy. As Foth and Caldwell (2018) argue, strategies that focus solely on energy efficiency are not enough to combat climate change as a whole.

The impact of human activity has attributed to a range of global issues as a consequence of "western bifurcated thinking" (Maller, 2018, p. 2) that has divided humans from natural environment. The global issues the world faces include climate change, pollution, loss of habitat along with the extinction of species. Due to a divisive design paradigm where urban environments like cities are designed as a separate entity from the natural environment. Despite our efforts as a society to achieve a space that is exclusively for humans and void of non-human nuisances, humans need to part of the natural environment in order to be healthy (Maller, 2018).

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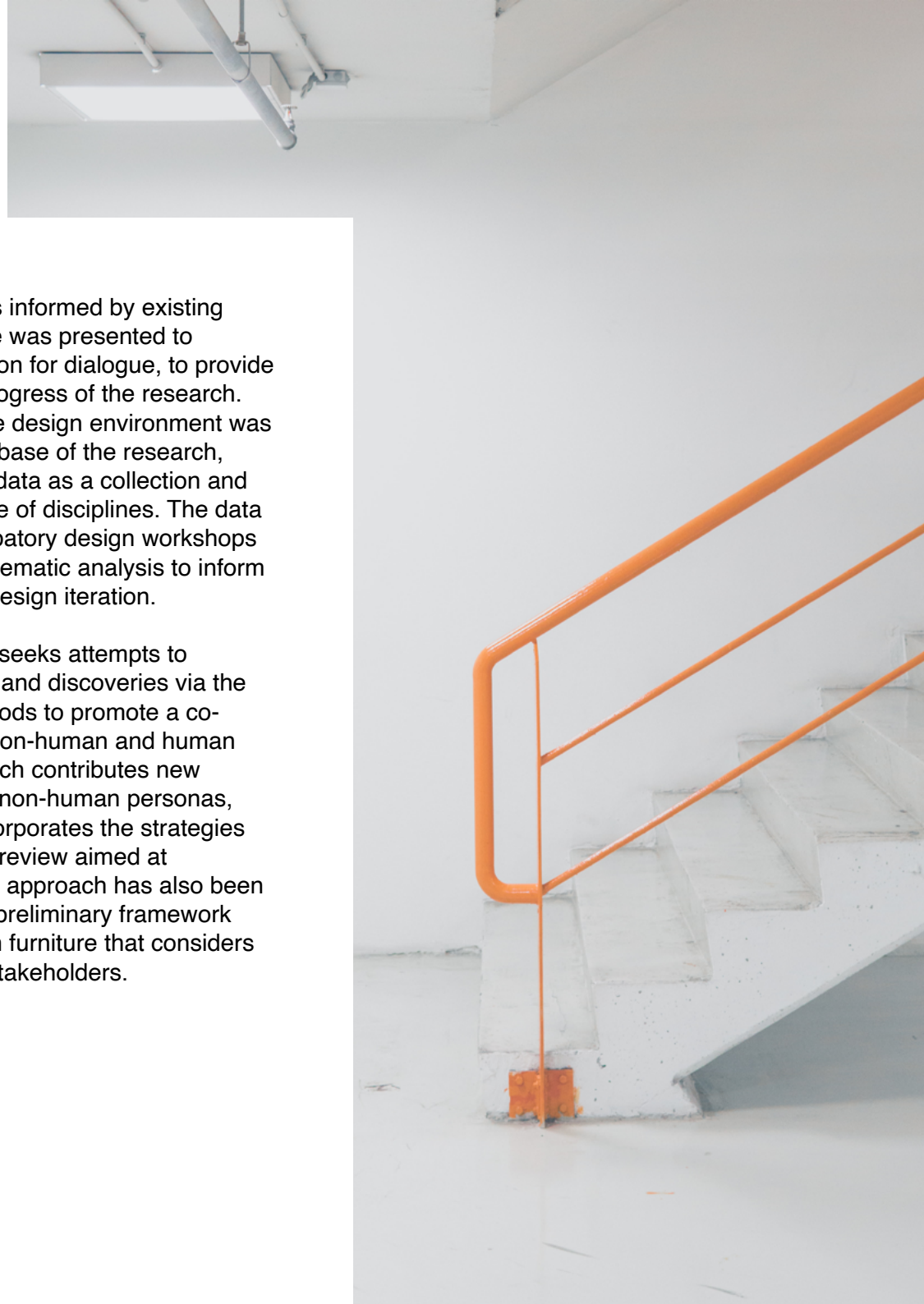


This research attempts to restore the connection between humans and non-humans within urban environments by presenting an investigation into a more-than-human approach on designing smart furniture. In this research a more-than-human approach is extending the scope of design beyond exclusively for humans, to include non-humans as part of the design process.
The non-human stakeholders are a selection of native flora that include the Red Spider Flower, Narrowed-leaved Bottlebrush, possums including the common Brushtail and Ringtail, birds and bees that have been chosen to promote a small-scale ecosystem. The human stakeholders identified the for the scope of this research include urban dwellers with limited access to green spaces in urban environments, particularly office workers and property owners.

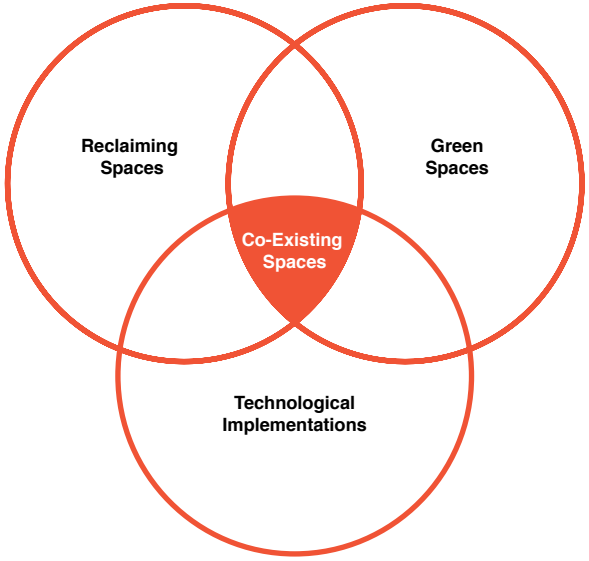
Through Participatory Action Research, we involve human representatives for non-human stakeholders in participatory design workshops to provide each stakeholder with a voice in the design process. Employing participatory design methods to enable a range of participants with accessible tools to contribute their perspective whilst retaining their disciplinal and social practices.
The activities included in the participatory design workshops included brainwriting, crazy 8s and a persona critique of the initial concept. Personas were developed as another tool to provide them agency in the participatory design workshops. The initial design concept was informed by existing precedence and literature was presented to participants as a foundation for dialogue, to provide critiques of the current progress of the research. The aim of a collaborative design environment was to extend the knowledge base of the research, through self-reflection of data as a collection and contributions from a range of disciplines. The data collected from the participatory design workshops were analysed through thematic analysis to inform the next direction of the design iteration.

The final design iteration seeks attempts to incorporate the feedback and discoveries via the participatory design methods to promote a co-existing space between non-human and human stakeholders. This research contributes new knowledge in the form of non-human personas, a design artefact that incorporates the strategies identified in the literature review aimed at improving cities. A design approach has also been formulated to serve as a preliminary framework for designing smart urban furniture that considers non-human and human stakeholders.

02.0 Literature Review

Strategies for Co-Existence in Urban Environments

This literature review investigates current strategies utilised in urban environments that seek to improve the liveability of cities for two groups of stakeholders who are non-human and human stakeholders. Reviewing the potential for each strategy to be utilised as an approach to developing a space that promotes the co-existence of both groups of stakeholders within urban environments. The current strategies in this literature review are technological implementation, green spaces and reclaiming spaces in urban environments.



02.1 Technological Implementations in Urban Environments

In this section of the literature review examines the applications of technological implementations in urban environments to develop cities more environmentally sustainable. Investigating how technological implementations are deployed in urban environments and their ecological impact. What do technological implementations offer in urban environments to make cities more inhabitable for urban dwellers that include non-human stakeholders which are native floral, possums, bees, birds and human stakeholders, in the scope this dissertation covers.

The progress on the development of environmentally sustainable cities has seen technological advances with a focus on sustainable energy interventions deployed in urban environments. This advancement of technological interventions has seen urban environments upgrade their efficiency and standards of how a city function (Sion, 2019). The two key methods around this approach of developing sustainable cities are to switch from using fossil fuel resources to a renewable source of energy and to reduce the consumption of energy (Kammen & Sunter, 2016). Both stakeholders stand to benefit from the reduction of using fossil fuels as resource, with less pollutants within cities leading to improved air quality.

Alternatives to using fossil fuel resources include but are not limited to solar energy, geothermal energy, wind energy, biomass energy. The advantages of utilising renewable energy sources is that they cannot be exhausted and can be reused repeatedly with zero or close to no emissions of greenhouse gases compared to fossil fuel sources (Panwar, Kaushik, & Kothari, 2011). The ecological risk of continuing to use fossil fuels as sources of energy is the impact towards climate change. Negative impacts that are directly and indirectly associated with using fossil fuels as a source for energy to power cities include the environmental pollution generated from the consumption of fossil fuels and the substantial resources required to extract fossil fuels. The impact to human health is also affected from continued use of fossil fuel as a consequence of exposure to pollution (Bos & Gupta, 2018).

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02.1 Technological Implementations in Urban Environments

Utilising renewable sources of energy to power cities can enhance a city's resilience by reducing their dependency on using fossil fuels which are externally sourced outside of cities to produce energy, a position that is argued by (Kammen & Sunter, 2016). The challenge of integrating renewable energy sources within urban environments is restrained by the availability of spaces for deployment (Kammen & Sunter, 2016). Existing structures and established spaces in urban environments have been barriers to overcome when deploying new interventions.

Solar energy as a renewable energy source has become more prevalent. The technology has become a more capable alternative energy source to fossil fuel due to their technical advancements and economic progress in the market. Solar energy deployed in urban environments has the capability to add on to existing structure like buildings. Taller buildings offer a larger surface area where solar energy technology can be integrated onto a building's design, implementing solar panels on roof tops or facades to capture solar energy (Kammen & Sunter, 2016). This ability to integrate solar energy technology as a power source in an urban environment to overcome spatial limitations demonstrates solar energy technology as a suitable intervention deployed in urban environments.

Wind energy also shares similar challenges to overcome, installation being an area of concern with limited availability of space within urban environments resulting in their low adoption. With less capabilities of deployment in urban environments compared to solar energy technology, wind energy has seen more limited implementation in urban environments.

From a data-driven approach, cities can reduce their consumption of energy by analysing new data provided from sensors. Sensors convert parameters from the physical environment into digital data where it can be interpreted by humans or computational applications. Sensors capture motion and activity then a system could respond according and adjust to the demand required from their city (Al Nuaimi, Al Neyadi, Mohamed, & Al-Jaroodi, 2015).

One such example of a data driven implementation is in a dynamic network city lighting installation, city managers can adjust the city's lighting usage accordingly to the level of activity sensors detect with real time data in specific spaces versus a city-wide approach where the lights are statically set to hours of operation. Reducing the consumption of energy by increasing the efficiency of the city's lighting installation to an as needed basis (Philips, n.d.). Sensors exclusively work to serve human stakeholders to address economical concerns. The sensors are bias they solely detect human activity, leaving non-human stakeholder unable to take advantage of this technological implementation. The technological implementations advancements and implementations in urban environments have demonstrated the capability of the technology as alternatives to fossil fuels and reducing the consumption of energy. Although progress in moving towards cities being more sustainable and more liveable, it has exclusively just focused on making it better for human inhabitants of urban environments. While the technological implementations have been a positive trend in terms of reducing carbon emissions and reducing usage of resources, there has been a shortcoming of consideration on how these technological implementations have impacted the natural environment as a whole.
According to Foth and Caldwell (2018), strategies that focus solely on energy efficiency are not enough to combat climate change as a whole. LED lighting it has seen an increase of utilisation due to its energy efficient performance has resulted around the world an increase of artificial light pollution. The negative impact of artificial lighting on the natural environment has affected wildlife like baby sea turtles mistaking the artificial lights as the moon when they hatch, the consequence of mistaking the artificial light for the moon light that is reflected off the ocean's surface is they head in the wrong direction, away from the ocean instead of towards the ocean (Witherrington & Martin, 2000).

An opportunity is presented here to implement sustainable interventions where humans are not sole the beneficiaries of technological implementations but also including non-humans as beneficiaries of such technological interventions.

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02.2 Green Spaces in Urban Environments

In this section of the literature review assesses the role and services greens spaces within urban environments.

Alongside technological implementations, another strategy cities can utilise to reduce their carbon footprint is by implementing carbon sinks within cities. Carbon sinks are natural or artificial reservoirs that absorb more carbon than they produce (Ocean & Climate Platform, 2016). One example of a carbon sink in cities are urban green spaces like parks. Parks in urban environments are able to supply a range of services to cities that include aiding in regulating the urban climate. The technique of using vegetation to cool buildings instead of using technological interventions, therefore reducing the consumption of energy by providing shade and improving the circulation of air. Utilisation of urban parks can help with reducing air pollutants directly, with research demonstrated they can filter on average 85% of air pollution (Haq, 2011).

Green spaces also serve another purpose as an important asset for the quality of life in urban environments like providing social and psychological benefits to urban dwellers in cities (Chiesura, 2004). Parks serve as a place for wellbeing and recreation for urban dwellers, using parks as a space to relax and socialise. Parks act as open spaces for human inhabitants of all groups and ages to make use of for recreation, contributing to a healthy and active lifestyle (Haq, 2011). When people are out in parks it also results in less energy consumption as they are not home, promoting urban dwellers to participate in outdoor activities. The utilisation of outdoor spaces by people is presented in a study in Helsinki, Finland where 97% of city residents took part in some form of recreation outdoors throughout the year. 50% of people would take part in outdoor activities every day or every second day (Haq, 2011). The level of stress decreased rapidly of people with exposure to the natural environment compared to the people that had exposure to the urban environment, their stress level remained high (Haq, 2011).

Urban parks also play an importance role not just catering to the needs of humans within urban environments but also non-humans that are found within cities. Currently the design approach of cities as urban environments is segregated from the natural environment. According to Dooren and Rose (2012, p. 16) describe the state of living conditions non-humans within urban environments “They have lived in cities on our terms, or not at all, and while cities have offered new niches and foods, they have also offered new perils”. With the progress of urbanised areas, it has reduced habitat opportunities for non-humans making it more difficult for them to find a nesting ground and food sources. Non-human entities can take advantage of green spaces within cities if they are designed appropriately to support a biosystem (Haq, 2011). A green space that has been designed to support non-humans can provide a space to make up for the loss of habitat for species affected by changes in land use such as urbanisation. Brenneisen argues for green spaces on a smaller scale can be used in urban environments as a potential tool for preserving and restoring biodiversity that may have been disrupted as a result of urbanisation (Brenneisen, 2006).

The barrier to integrate more green spaces such as parks is how to overcome the special limitations in established urban environments. A deterrent of people using parks is the quality of the space, parks in disrepair are also perceived as unsafe spaces for people to use (Lee & Maheswaran, 2011). Maintenance of green spaces is a crucial factor for green spaces to thrive in urban environments and prolonged use. Haq (2011) argues for the usefulness of green space to maintain the ecological aspects of a sustainable urban environment, emphasising the importance of using plant species that have adapted to the local environmental conditions being critical to a successful green space that is self-sufficient and sustainable with lost maintenance costs.

02.3 Reclaiming Spaces in Urban Environments

Tactical Urbanism

In this section of the literature review investigates what tactical urbanism is and how this movement is utilised by both top-down stakeholders who are authoritative organisations and bottom-up stakeholders who are community groups, citizen activists and individual organisations (Lydon & Garcia, 2015).

A bottom-up approach known as tactical urbanism is a short-term low-cost method utilised by government, private, citizen groups and individuals within urban environments making use of an open and iterative development processes. (Lydon & Garcia, 2015). Tactical urbanism has challenged the authority over public spaces within urban environments, which is conventionally a top-down approach driven by government authorities. Conventional top-down approaches require formal planning processes to account for all variables when implementing interventions in urban environments for its citizens. The conventional top-down approach is a process slow due to the rigid nature of planning institutions and disconnection from the community it aims to serve (Silva, 2016).

In a top-down approach, citizens would participate in urban planning sessions delivered by top-down stakeholders in the form of townhalls, a communal gathering of citizens and city representatives. Whereas tactical urbanism a bottom-up approach is a contrast to conventional top-down approach and seeks to address the shortcoming of top-down approaches. The issue with utilising townhalls as a method to engage a dialogue between the two stakeholders is that citizens would have to go out of their way to attend a townhall limiting the potential scope of citizens (Lydon & Garcia, 2015). Top-down stakeholders could instead use tactical urbanism approaches to deploy interventions into urban spaces people already spend time during the day, bringing the townhall to citizens. By bringing a form of dialogue engagement to citizens can be involved in the process of urban planning strategies expanding the scope of available citizens to participate (Lydon & Garcia, 2015).

Tactical urbanism invites new dialogue between city authority and city citizens. A strength of tactical urbanism approaches is the ability to act on opportunities, meeting new demands required from citizens within urban spaces (Silva, 2016). Often these opportunities are identified as underused spaces, tactical urbanism responds to wasted spaces to act on whereas planning institutions respond to malfunctions. The movement has seen tactical urbanism as a nimble and agile responses to reclaim and repurpose urban environments for urban dwellers, treating urban spaces as dynamic and ever changing. (Silva, 2016) Unlike conventional top-down approaches tactical urbanism does not propose a one size fits all solution instead is specific and flexible in its approach to urban planning (Lydon & Garcia, 2015).

Lydon and Garcia (2015) identify three common applications for tactical urbanism.

- Can be utilised by citizens to bypass the conventional bureaucratic processes as a way to protest, to visualise the possibility of change.
- An engagement tool for top-down stakeholders to increase the scope of public involvement throughout the design process.
- A tool to act as a test pilot used by top-down stakeholders to evaluate projects before investing in them as long-term investments.

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02.3 Reclaiming Spaces in Urban Environments

Bike Lanes

An activists group known as the ‘Reasonably Polite Seattleites’ sought to present an easy and cost-effective solution of making bike lanes safer to the city of Seattle, United States of America. The activist group used $350 worth of reflective pylons that were deployed converting a bike lane into a safety bike lane. To emphasise their politeness the group made it easily removable by attaching the pylons to adhesive tags. The city responded with a polite email in return thanking the activist group for their statement and apologized for removal of the pylons (Fucoloro, 2013). This urbanism tactic aligns with the first application where citizens bypassed the city system to demonstrate the ease of making bike lanes safer. While not used as a test pilot by top-down stakeholders, the activists group bring forth value the reflective pylons bought to bike lanes.

Figure 1 Safety Bike Lanes (Fucoloro, 2013)

Guerrilla Gardens

This urbanism tactic is a direct response to raise awareness of neglected spots through unauthorised gardening initiatives (Douglas, 2014). Guerrilla gardeners aim to bring attention to neglected spots by beautifying them, cultivating land all without permission. Neglected spaces might include road medians or vacant lots. Turning neglected spots into spaces for the community to take part in, fostering social engagements. This urbanism tactic also operated a grey area of the law, while the act of gardening is legal it was on particular land that made it illegal. Guerrilla gardening initiatives sought to reclaim public spaces that were left neglected by the city bringing a new purpose to the space.

Figure 2 Guerrilla Garden (GuerrillaGardening.org, n.d.)

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02.3 Reclaiming Spaces in Urban Environments

Park(ing) Day to Parklets

Currently green spaces within urban environments are regulated by local authorities (Haq, 2011) a top down approach where citizens that inhabit within urban environments have little to no voice of how green spaces are used. The lack of participation of citizens is constricted due to the current method of dialogue of stakeholders that takes place in townhalls. As identified in earlier in this literature review section of the dissertation is the challenge of deploying interventions due to the limited availability of spaces in urban environments. A guerrilla urbanism tactic known as 'Park(ing) Day' has changed the perception of how people perceive what public spaces could be. Park(ing) Day now a global event started as 'Par(king) Action' in November 2005 when Rebar an activist organisation paid for a two-hour parking space in San Francisco and converted the space with a bench, a tree and with sod creating the first Parklet. The action carried out by Rebar sought to raise awareness around the need for access to quality public spaces. This urbanism tactic takes advantage of existing spaces such as car parking spaces and converts them into a different space that has been repurposed for another use instead of a car parking space (Thorpe, 2016).

This bottom up approach has empowered citizens within urban environments to engage in how spaces could be used. Park(ing) Day has evolved into Parklets that are more formalised and more permanent installations within urban environments. The redistribution of roles and changing demands are challenging the current arrangements of governance over public spaces. Parklets have provided new opportunities within urban environments to reconnect with the environment and each other (Littke, 2016). Blurring the lines of participatory planning and civic engagement between government and citizens as a result from the urbanism tactic known as Park(ing) Day (Davidson, 2013). The city of San Francisco developed a program called 'pavement2park' to recognise and formalise parklets deployed in urban environments.

Figure 3 Rebar's setup in San Francisco, 2005 (Thrope, 2016)

The redistribution of roles and changing demands are challenging the current arrangements of governance over public spaces. Parklets have provided new opportunities within urban environments to reconnect with the environment and each other (Littke, 2016). Blurring the lines of participatory planning and civic engagement between government and citizens as a result from the urbanism tactic known as Park(ing) Day (Davidson, 2013).

02.3 Reclaiming Spaces in Urban Environments

Figure 4 Parklet in K Street Northwest in Washington D.C (Pfleger, 2015)

Figure 5 Parklet in K Street Northwest in Washington D.C (Pfleger, 2015)

As another tactical urbanism intervention, Parklets present a cheap and effective strategy to introduce more public spaces in urban environments to keep up with the demands that public funds cannot meet (Institute of Transportation Engineers, 2013) (Littke, 2016). Parklets are encouraged to include green vegetation within their installation to reflect the characteristics as parks in urban environments. Mentioned earlier about the role and services green spaces in urban environments provide are a multi-purpose. Littke (2016, p. 173) expresses the current state of the green vegetation used in Parklets as "…decorative, cosmetic features—not contributing to climate mitigation nor providing multiple ecosystem services." At present, parklets serve as an extension of public spaces for humans to use, a place for socialising and relaxing. Parks also serve as an ecological tool whereas parklets lack this capability to preserve or promote an ecosystem in an urban environment.

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02.4 Existing Smart Urban Furniture

Figure 6 PowerMe™ - Smart Bench (Street Furniture Australia, 2018)

Name
PowerMe™

Designed by
Street Furniture Australia

Features
Form factor of a street bench. Capability to charge mobile devices via a wireless pad or using ports available. Includes sensors to provide asset managers how often it is being used. WiFi capability for users within the vicinity of the smart bench.

Ecological considerations

This solution offers a modulator component within its design to enable assets managers the ability to upgrade technological components, replacing a component with a more current technologies rather than making the whole unit obsolete as technology advances. This solution has no capability to operate with an internal power source and is required to connect to an external power source like the main power grid. There is no option available for this solution to use renewable energy, unless this solution is connected to a power grid that utilises renewable energy sources.

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02.4 Existing Smart Urban Furniture

Figure 7 IntelligentCity – Outdoor Lighting (Philips, n.d.)

Name
IntelligentCity – Outdoor Lighting

Designed by
Philips

Features
Form factor of outdoor streetlights setup up as a network of lights. Sensors are integrated into the lights to monitor activity and provide real-time data for city managers to adjust the demand accordingly reducing or increasing the output of lights. The other use for the sensor they can be autonomous and automatically adjust without human action.

Ecological considerations

This solution offers a modulation component within its design to enable assets managers the ability to upgrade technological components, replacing a component with a more current technologies rather than making the whole unit obsolete as technology advances. This solution has no capability to operate with an internal power source and is required to connect to an external power source like the main power grid. There is no option available for this solution to use renewable energy, unless this solution is connected to a power grid that utilises renewable energy sources.

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02.4 Existing Smart Urban Furniture

Figure 8 Smart Bench (Strawberry Energy, n.d.)

Name
Smart Bench

Designed by
Strawberry Energy

Features
Form factor of a street bench. This bench smart bench has the capability to use solar energy with its integrated solar panels on the top of the structure. The top structure serves to hold the solar panel in an elevated position to reduce potential obstruction from the sun. Some shelter is provided from the top structure of the smart bench to provide human users some shielding from the sun and rain. This smart bench also provides human users the capability to charge their mobile devices via a USB port, cables provided or a wireless pad. Sensors integrated in this smart bench integrated monitor air quality, humidity, temperature, noise level and pressure. The installation process is relatively easy compared to other street furniture as does not require a connection to the main power grid to power its features on board.

Ecological considerations

This solution offers a modulation component within its design The integration of a solar panel enables this urban furniture to take advantage of a renewable energy source. Due to its ease of the installation of this smart bench it is easily relocatable to move another location so that can be utilised in areas with higher activity, then going to waste in an area with less activity.

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02.4 Existing Smart Urban Furniture

Figure 9 Solar Bench (Croatia Week, 2016)

Name
Solar Bench

Designed by
Universal Industries

Features
This urban furniture is deployed as a bench. The solar bench includes integrated sensors that monitors air temperature, pressure, humidity and UV levels. This bench has the capability to charge mobile devices. The bench is takes advantage of the sun as a renewable energy source with its solar panels. Lighting capabilities are also integrated within this bench.

Ecological considerations

The lights are set based of a scheduled time rather than using sensors to active when needed. Using energy may not be as efficient as it could. The artificial lighting pollution is somewhat addressed as the light is more localised and contextual rather than a high structure to provide a larger light coverage. However, the bench is powered by solar energy to mitigate the impact on the environment as a result of the inefficient power usage.

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02.4 Existing Smart Urban Furniture

These designs showcase some of the strategies being carried out in urban environments. The common theme across these designs is the approach of enhancing existing forms of urban street furniture and adding features to improve upon them. Another common theme that also applies across all designs presented is the lack consider for non-human users. This recent trend of making urban furniture ‘smart’ is an opportunity to also involve non-human users as part of the approach of designing smart urban furniture.

02.5 Gap

The opportunity identified in existing literature is an approach to incorporate the strategies discussed in the literature review. The strategies discussed include technological implementations and green spaces within urban environments by reclaiming spaces to serve both non-human and human stakeholders.

Enhancing the liveability of cities and promoting the co-existence of non-human and human stakeholders in urban environments. This dissertation seeks to also address the short comings of current approaches and design interventions which is human centric to also cater for non-human. Building onto Parklets as an approach to integrate the ideas of promoting a co-existing space for both stakeholders to overcome spacial limitations in urban environments.

A challenge that has been identified for the deployment of intervention in urban spaces has been the limited availability of space. To address this issue of limited spaces in the urban environment, the technique of reclaiming spaces has been recognised as a method to deploy design interventions by repurposing existing public spaces. Green spaces as discussed earlier in the literature review demonstrates the benefits for both non-human and human stakeholders can take advantage of in urban environments. The technological implementations presented have also lacked the consideration for potential non-human users. This research attempts to incorporate and adapt existing technology as suitable technological interventions for non-human stakeholders.

The next section of this research will discuss the approach of building on the knowledge presented in the literature review.

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03.0 Methodology

Research Approach
The objective for this research dissertation is to investigate the approach of more-than-human design as a means of creating a space in urban environments that promotes the co-existence of non-human and human stakeholders. As previously discussed in the literature review, the three significant areas of knowledge this research is informed by are (1) Technological Implementations in Urban Environments; (2) Green Spaces in Urban Environments; and (3) Reclamation of Urban Spaces. This research utilises qualitative data collection methods as the primary technique for collecting research data in order to evaluate an initial design concept and to inform the next design concept iteration.

Research Aim
To design smart urban furniture with non-human and human stakeholders to promote a co-existing space.

Research Methodology
This research seeks to contribute new knowledge discussed in the literature review section by evaluating potential strategies integrated together to design an artefact that promotes a co-existing space for non-human and human stakeholders within urban environments. The methodology selected for this research was Participatory Action Research to involve a range of participants in the design process. The research design incorporated a range of participatory design methods to facilitate a collaborative and interactive approach for this research.

Research Questions

Research Question 1 (RQ1) How can smart urban furniture be designed for non-human and human stakeholders to reclaim urban spaces and create greener co-existing spaces in urban environments?

The intention of this question is to explore how urban spaces can be reclaimed to create green co-existing spaces for both non-human and human stakeholders.

Research Question 2 (RQ2) How can participatory methods contribute towards creating a collaborative design approach that involves non-human and human stakeholders?

This question examines the opportunities participatory methods can provide in order to reach beyond traditional human-centred design and towards a collaborative more-than-human design approach.

Research Methodology
This research seeks to contribute new knowledge discussed in the literature review section by evaluating potential strategies integrated together to design an artefact that promotes a co-existing space for non-human and human stakeholders within urban environments. The methodology selected for this research was Participatory Action Research to involve a range of participants in the design process. The research design incorporated a range of participatory design methods to facilitate a collaborative and interactive approach for this research.

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03.1 Participatory Action Research

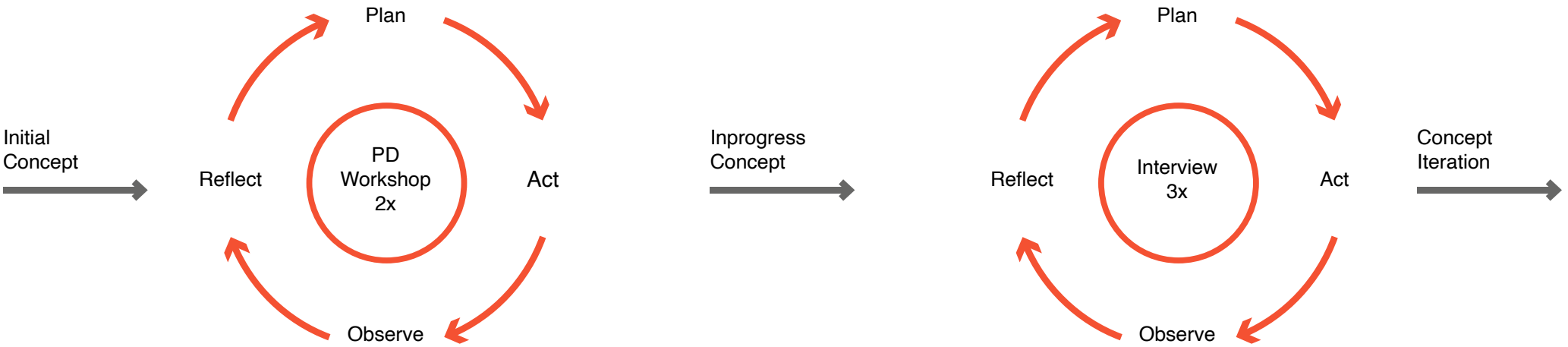

Figure 10 Participatory Action Research Cycle

This methodology is qualitative research that incorporates techniques of observing, documenting, analysis and identifying patterns (MacDonald, 2012). Considered a subset of action research, this methodology aims to generate practical knowledge through a process. The process involved in action research is a systematic collection of data, then interpreting and analysing so that action can be taken to create change (MacDonald, 2012). Participatory action research responds to the needs, circumstances and particulars of a practical situation as a collaborative process through discussion as a collective and self-reflecting of the research. By bringing participants together and enabling them to bring in their own social and educational practices into the process from the start of the initial design. In participatory action research individuals involved are active participants rather than passive contributors in the pursuit of new knowledge to inform the next direction of the design process (MacDonald, 2012) (Chevealier & Buckles, 2019).

The distinct trait that participatory action research differs from other conventional research, is acquiring knowledge for the purpose to enable action. This action achieved is through a reflective cycle from a collection of data and analysis to inform the next direction of the research (Fran Baum, Macdougall, & Smith, 2006). The outcome of this action goes through analysis from participants involved again and is further researched with an iterative reflective cycle refer to Figure 10.

Participatory Action Research serves as a democratic methodology, enabling the participation of all people to partake in the research. This decentralised research methodology shifts away from traditional research paradigms that involve external experts solely rather than also making use of members from within the community (Mordock & Krasny, 2001). By making members of the community this recognises them as a partner alongside the researcher. Having a participant(s) as partners in the design process distributes the ownership of the research across participants involved instead of solely on the research.

03.2 Persona Design

One of the challenges experienced during this research was the involvement and representation of non-human stakeholders. This is limited by the fact that non-human stakeholders can't physically be involved in the design process, but rather represented by a proxy stakeholder who speaks on behalf to voice their needs, wants and aspirations.

Following the work of (Frawley & Dyson, 2014) where they developed non-human personas to bridge the gap of understanding another stakeholder in this research. Non-human stakeholder personas were produced to provide a grounded human perspective for participants. Secondary data of existing research literature of possums served as the basis for the construction of possum personas and alongside the possum personas, a human persona was also constructed to compliment the possum persona and also provide another perspective of the interactions humans experience when co-existing in a shared space with possums. The non-human personas served as a representation to amplify the agency of the non-human stakeholders absent from the participatory design workshop (Tehseen & Brigstocke, 2018).

03.3 Participatory Design and Co-Design

An important aspect of participatory design is its inclusive nature to involve a range of individuals as participants. This inclusiveness is due to the ability participatory design has of empowering individuals with accessible tools to be part of the dialogue in the design process. Another key role participatory design has, is expanding the knowledge base of the research from the contribution from participants, adding new insight, skills and an expansion of new potential networking connections by fostering collaboration (Mayoux & Chambers, 2005). With accessible tools to participant it also lowers the barrier to overcome in order to participate.

Scientific mainstream research methods have behaved towards non-humans like animals as passive objects within the research (Tehseen & Brigstocke, 2018). Through participatory design methods, this research attempts to integrate non-human stakeholders to the equivalent stature of human stakeholders. The successful outcome of a participatory design method is essentially connected to the different voices that have contributed to the design of the research (Bratteteig & Wagner, 2016). For the purpose of this research participatory design methods were used to involve participants' knowledge to contribute to research. The diversity of disciplines was important to expand the knowledge base of this research. The makeup of participants for this research included individuals with a connection to non-human stakeholder like possums.
Participants range of background expertise which included architecture, interaction design, computer science, material engineering, urban informatics, environmental management and fellow MIDEA Students.

03.4 Research Limitations

A communicative limitation between the two stakeholders involved in this research is a challenge within this research dissertation is the involvement of non-human stakeholders. While it would be ideal to have an actual possum or other non-human stakeholders as a participant in the design process, translating their language of communication to a form which humans can also understand is difficult to say the least.

An environmental limitation is adapting participatory design workshops and methods involved to an online environment. The challenge is maintaining methods that are engaging and encourages creative ideas from participants in an online environment. Moving the participatory design workshops to an online environment to accommodate the current conditions of COVID-19. Utilising selected activities that would be suitable methods in the transition and retain the same applications as they would in a physical real-world environment when carried out on an online environment. Participatory design activities will also retain effectiveness in a limited time window as well to accommodate the one-hour length workshops. One strategy to use the time efficiently in the participatory design workshops by reducing the amount of preparation time required from participants. Another time requirement of participatory action research the commitment required from participants to continue to be involved throughout the design process (MacDonald, 2012). One strategy to assist with the commitment of participants is to have additional opportunities for participants to contribute if they are unable to participate in a group participatory design workshop. Catchup interviews with participants could serve as an alternative method to maintain participants up to date with the current progress of the research.

However, the shift to an online environment did widen the scope of available participants that might not have been possible in a real-world environment. As participatory design workshops were no longer restricted to one physical location, resulting in one less factor to worry about when considering the availability of participants since they were no longer required to be present at a specific time and location to participate in a participatory design workshop.

Linda and Robert (2005) discuss the difficulty when synthesising rich and various data collected from participatory methods without distortion. Due to the complexity of reality partly and the balance of influence the facilitator has onto the workshop, keeping the workshop on task within the scope of the research. Facilitators will also have to consider when to enable and interrupt participants when they are contributing their own perspectives which may be conflicting. The concern with participants sharing their insights without moderation, there is the potential of deviating the course of the workshop. As discussed by Tone and Ina (2016) asserted the importance of designers respecting participants' contributions in participatory design methods as part of the design process, even if designers disagreed with them. The representation of the research will also have potential trade-offs in the documentation between maintaining clarity and the omission of details.

Tone and Ina (2016) also discuss a concern where the design team may have to take a side between the stakeholders by supporting the interests of one stakeholder over the other(s). This decision may be due to the design team supporting the interests of a stakeholder that is more vulnerable compared to the other and making a designed compromise that may directly affect the other stakeholder(s).

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03.5 Research Methods

In this section of the methodology outlines the methods selected and how they have been applied. The methods below have been utilised to fit within the characteristics of participatory action research and participatory design as discussed earlier in the research methodology section.

Participatory Design Workshops - 2 workshops

The first point of the design process is the participatory design workshops when ideas and initial concepts are externalised from the researcher to others. Involving participants in the design process to inform the next iteration on the initial design concept based on initial literature review.

The sequence of the participartory design workshops is presented below.

Intro → Context

Brainwriting → Exploring ideas

Crazy 8s → Refining ideas

Show & Tell → Sharing Concept

Persona Critique → Evaluating initial concepts

Make up of participants

- Architects
- Computer Science
- Interaction Designers
- Material Engineer
- Urban Infomatics
- MIDEA Students
- Environmental Management

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03.5 Research Methods

Participatory Design Workshops - 2 workshops

The agenda for participatory workshops involved:

Introduction to the area of research to provide participants context and scope of the research area and as a foundation to build onto the initial design concepts that have been presented. Initial design concepts served as a representation of the current stage of the research and stimulate discussion to evaluate the suitability of the initial concept and provide critical feedback to inform the next design concept iteration.

Brainwriting served as an exercise to generate a vast number of ideas within a limited time frame. Promoting and encouraging quick ideas so that were not withheld by participants because of their unpolished state and embracing the range and exploration of ideas. Participants are working simultaneously during this method providing opportunities for timid participants to contribute without being hindered by more expressive participants dominating the dialogue (Litcanu, Prostean, Oros, & Mnerie, 2015).

Brainwriting does not require a lot of time for preparation due to the simplicity of the method. This method also runs at a high pace, with participants given two minutes at the first round to develop their three ideas. In the second round participants move onto the other participants section to build on to their three ideas only this time with forty seconds for every round after the first. Ending when participants have cycled through everyone else's section.

Crazy 8s provided an opportunity for participants to build on to a selected idea from the brain writing activity. The first round in this activity involves participants generating 8 ideas these ideas could be a sketch drawing or a short sentence about a certain idea also within a limited amount of time. Participants were given forty seconds for each idea, after the eighth idea

Show & Tell was where participants shared the outcome of the crazy 8s activity, discussing the focus of their concept and what issues their concept was aiming to address.

Persona Critique an activity to contribute feedback that is from the perspective of stakeholders in the scope of this research dissertation. A persona provided a digestible format for participants to familiarise themselves with the stakeholders this initial design concept has been designed to cater to. Providing critique on the initial concept design, of what participants thought from the perspective of the personas on what they might agree or disagree with design decisions of the initial concepts (Frawley & Dyson, 2014).

03.5 Research Methods

Questionnaires - 5 responses

The questionnaires were additional insights from participants after the participatory workshops. Providing an additional point to contribute further if participants had available time after the participatory workshops.

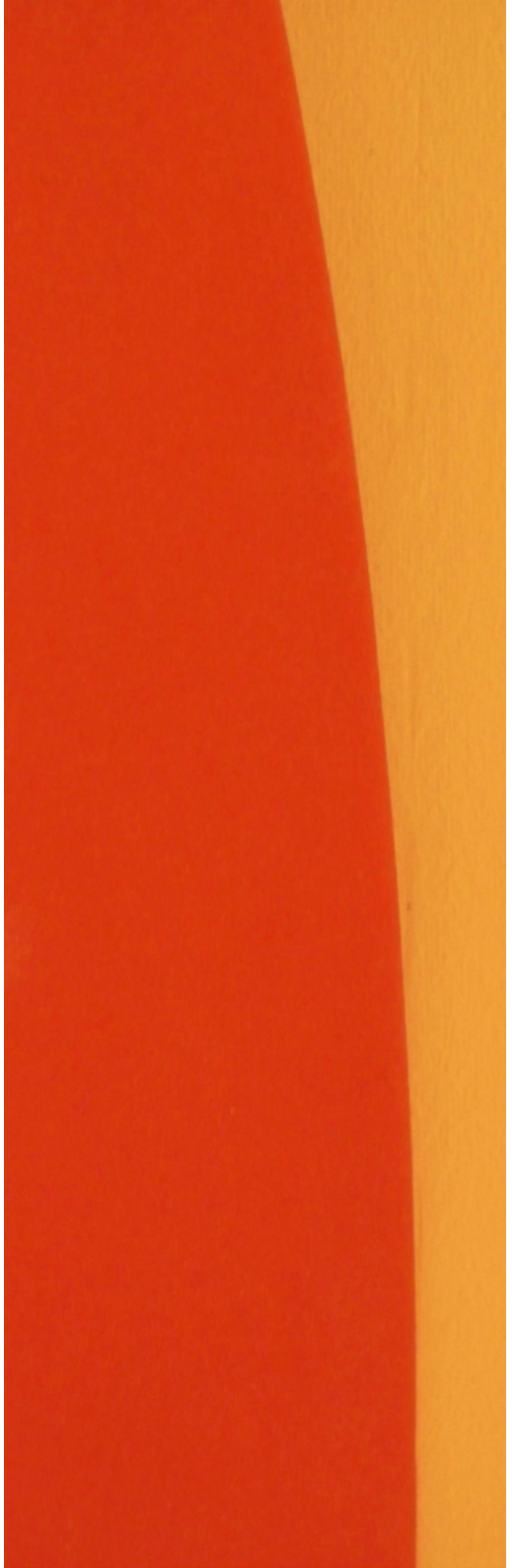
Interviews - 3 interviewees

Post participatory workshop interviews were conducted to gauge the current direction of the design concept iteration with a semi-structured interview. The interview included revisiting the initial concepts and presenting the current progress and direction of the design iteration for critique.

03.6 Data Analysis and Interpretation

Data from the various research mentioned above were transcribed if required, from an audio format into text. The data collected through the use of research methods mentioned above were interpreted using thematic analysis. Analysing the research data from a bottom-up approach to identify and generate codes from emerging patterns to then grouping similar codes together to form an overarching theme (Braun & Clarke, 2006). Codes generated from the data are the smallest form of analysis to encapsulate an interesting detail that may be significant later in the research. Patterns emerge from relevant and similar codes reoccurring that form the building blocks of themes. Themes enable a framework for organising and documenting the researcher's analysis of the data (Clarke & Braun, 2017).

The flexibility of applications thematic analysis has across a range of formats makes it an accessible and systematic method for interpreting qualitative data to meaning generation. The applicableness of thematic analysis as a method to interpret research data across a range of formats makes it a suitable process of analysis and interpretation for this research. The research methods discussed earlier in this section will produce data in different formats and will require a flexible method for data analysis.



03.7 Research Process

The diverse range of design methods will be utilised for this research to investigate a more-than-human design for smart urban furniture. With participatory action research as the research methodology and the use of participatory design methods will provide a rich range of qualitative responses from participants. To make sense of the research data, a thematic analysis of the data collected from the participatory methods will be carried out to interpret the data. Once the data has been analysed the themes generated from the thematic analysis will inform the direction of the next design iteration.

Initial Concept
based from literature research

PD Workshop 1
facilitation of workshop with co-participants, presenting initial concepts

PD Workshop 2
facilitation of workshop with co-participants, presenting initial concepts

Analysis of Workshop
analysing and reflecting data from participatory design workshop

In-progress Concept
interpreting data and contributions from participatory design workshops to inform design of next concept iteration

Interviews
analysis and critique of direction for next concept iteration

Analysis of Interviews
analysing and reflecting data from interviews

Concept Iteration
iterating on first concept iteration to incorporate new findings from syntheisis of research

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04.0 Studies & Findings

This section of the research dissertation will discuss the results and findings of the participatory design methods carried out as outlined in the methodology section. This section will specifically discuss: (1) contributions from participants during the two participatory design workshops, post-experience surveys and interviews conducted; (2) present the identified themes that emerged during the workshop activities; and (3) outline how these contributions informed the final design solution.

04.1 Identification of Stakeholders

This section of the studies will discuss how the stakeholders were identified and selected to establish a design brief as a response to the research questions. The goal of the design concept is to cultivate a co-existing space for non-human and human stakeholders. This research changes the rhetoric of human-centric design approaches to placing non-human stakeholders alongside human stakeholders in the design process. A response to conventional design approaches where it has been human-centric, this research attempts to shift away from this current design paradigm.

Human Stakeholders

Figure 11 Emma the Inner City Dweller

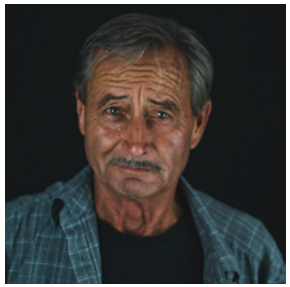

Figure 12 Adrian the Proud Homeowner

Non-Human Stakeholders

Figure 13 Beans the Possum

Figure 14 Florence the Native Flora

Figure 15 Loraine the Lorikeet

Figure 16 Buzzy the Bee

04.2 Non-human Stakeholders

Identified and selected was the ring tail possum and brushtail possum as the first non-human stakeholder. The increase and progress of urban development have displaced ringtail and brushtail possums due to the loss of natural habitation. Current human interventions to aid in restoring habitats for possums have been through the use of nesting boxes installed onto trees (Goldingay, Rueegger, Grimson, & Taylor, 2015). The nesting boxes are a strategy to compensate for the loss of certain trees due to changes in land use. Certain trees that have cavities or also known as hollows that are required to provide habitat opportunities for possums. However, these interventions are rarely adopted by local communities due to the perception of possums being a pest (Hill, Carbery, & Deane, 2007). The issues human stakeholders encounter involves possums causing damage to property from nesting in rooftop cavities and causing sleeping disturbances. Due to protections placed on possums as a conservation measure, residents are unable to take measures into their own hands. This leaves residents in a situation where they are required to call for external assistance from wildlife management agencies.

There is also an economic opportunity to alleviate wildlife management agencies that receive a number of requests each year to assist with the removal of possums from the property. By transitioning the role of wildlife management agencies to carry out preventative operations rather than reactionary operations. Wildlife management agencies are tasked with balancing the possum nuisance in a humane whilst also safeguarding the future of the possum population. Relocation a strategy that has been proven unsuccessful through post-release monitoring. Studies from post-release monitoring found the majority of possums died from predators like foxes and a failure to establish a territory for themselves due to competition from other territorial brush tail possums. The relocation strategy has since been removed and is replaced by a policy that favours co-living with possums instead. Cases of illegal relocation from affected residents are frequently reported implying the failure of wildlife management agencies delivering an effective solution between the conflict of humans and possums (Hill et al., 2007).

The first approach considered in this research was creating a design artefact that possums would be attracted to and take advantage of. Providing resources and a nesting home would be a focus for the initial approach to design an artefact that possums can make use of in urban environments. The inclusion of native flora to serve as a food source for possums and pollination opportunities. Native flora has evolved and adapted to the current climate conditions reducing the need for intensive gardening maintenance over time to sustain them. Once native flora are established they help return the area as a healthy eco-system by attracting a range of fauna, enhancing the bio-diversity. (Butler, Butler, & Orians, 2012).

The native flora selected to include in the design of this artefact are (North Sydney Council, n.d.) (Smith, 2004):

- Red Spider Flower - food source for possums, birds and pollination opportunity for bees
- Narrow-leaved Bottlebrush - food source for possums, birds and pollination opportunity for bees
- Old Mans Beard/Travellers Joy – a vigorous twiner to provide climbing opportunities for possums, source of food for birds and bees and pollination opportunities for bees.

Pollinators such as birds and bees will play a crucial role in this small-scale ecosystem in sustaining the lifecycle of native flora. 75% of our crop species benefit from the pollination of insect pollinators (Goulson, Nicholls, Botias, & Rotheray, 2015). Bees, one of the insect pollinators is experiencing more burdens as a consequence of the increased human activity. The reported decline of bees as a result of land use changes along with an increased usage of pesticides both contributing to the ongoing degradation of habitat and pollination opportunities. Managed and wild bees contribute up to 87% of the pollination for the world's flowering plants (Threlfall et al., 2015). The role bees play as an important pollinator also make them the most economically impactful if anything would happen to them.

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04.3 Access to Green Spaces

In a study conducted in Sheffield, United Kingdom evaluated the accessibility of green spaces amongst 10,000 randomly selected addresses across the city (Barbosa et al., 2007). The findings presented in Table 1 include the agency's recommendation of time and distance to access to green spaces. Green spaces were defined as "public parks, public gardens, cemeteries, gardens associated with public buildings, and all school playing fields" (Barbosa et al., 2007, p. 188). The findings in Table 2 outline the access to public parks, which reveals the drastic difference of access urban dwellers have to green spaces. This data set demonstrates the importance of increasing public green spaces in urban environments required to meet the recommendations of both agencies.

Table 1 Access to Green Spaces

Agency	Distance(m)	Time(min)	Households Met
English Nature	300	5	36.5%
European Environment	900	15	95.6%

Table 2 Access to Public Parks

Agency	Distance(m)	Time(min)	Households Met
English Nature	300	5	18%
European Environment	900	15	58%

04.4 Human Stakeholders

There are two human stakeholders which have been identified in this study, urban dwellers and property owners. A challenge cities face in highly dense urban areas is the lack of access to green spaces as presented in the findings above. To meet the growing urban population cities are going through a process of densification or expansion of urban environment. A consequence of urban development in densified urban areas has been the removal of green spaces. The loss of green spaces in developed countries has been documented and revealed a 5% decrease in both private and public green spaces (Haaland & van den Bosch, 2015). As previously mentioned in the literature review green spaces provide a range of beneficial services for humans living in urban environments. This highlights an issue of spatial availability in cities for urban dwellers, a strategy discussed in the literature review is reclaiming spaces in urban environments by repurposing existing public spaces.

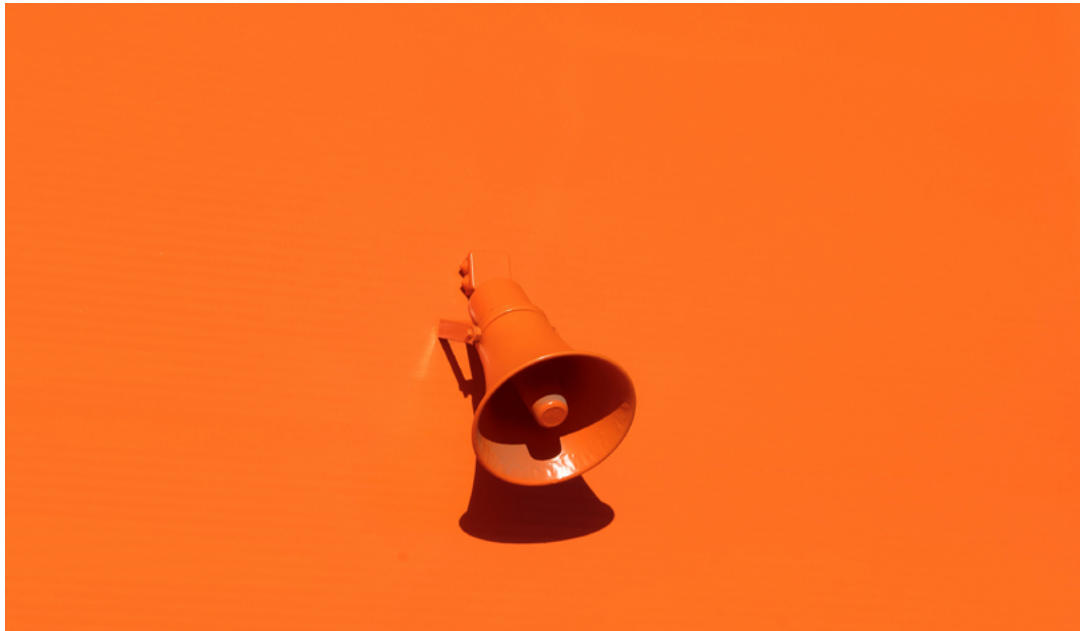
Discussed earlier in this section on possums co-existing with possums property owners co-existing with possums experience damage to property. Some issues property owners face include gardens being ravaged, rooftops being broken into by possums as a nesting ground causing sleeping disturbances as possums are nocturnal. As possums have protection in place for conversation strategies it leaves property owners unable to take any action that directly impacts the possums. This present an opportunity to address the conflict between property owners and possums co-existing in urban environments. Implementing a design intervention in public spaces to encourage possums away from residential property, to serve as a habitat alternative in urban environments.

04.5 Implications

This study presents an opportunity to address the limited access to public green spaces for urban dwellers that include both non-human and human stakeholders. This dissertation, attempts to investigate the potential of reclaiming spaces as a strategy to increase green spaces in urban environments. Using Parklets as a foundation to build onto an intervention to address the issues faced by urban dwellers in an urban environment. The issues experienced by non-human stakeholders include reduced habitat opportunities, a decline in pollinators along with pollination opportunities and limited access to green spaces.

04.6 Persona Design

To communicate the background studies on the stakeholders in this project personas were created as an accessible format to provide participants with a perspective from the stakeholders involved. A digestible format for participants to learn about the stakeholders is important to conserve time in the participatory design workshops. By reducing the time taken up for providing participants with context so that the rest of the time can be used to facilitate participatory design methods. The approach to creating non-human persona and applications followed previous work from (Frawley & Dyson, 2014). Using the personas to represent the agency of the absence of the non-human stakeholder and using them in persona critiques to evaluate the initial design. However, in this research utilised existing research literature instead of conducting primary research on the animals to collect data to form the personas. Identifying the key insights and issues possums face to create a persona to condense all the findings into an accessible format for participants (Hill et al., 2007) (Smith, 2004).



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04.6 **Persona Design**

Belown is an example of identified key data creating the non-human personas from existing research literature. Creating a backstory to communicate the nocturnal lifecycle of possums. Providing a narrative of the issues and frustrations possum faces, such as being captured and relocated. Including the motivations of the possum and the potential motivators for the possum.

Lifestyle (nocturnal) **Backstory**

Beans the possum is usually up during the night while it is quieter and there is less going on around Beans. Compared to during the day when there is plenty of activity from other species, Beans prefers to sleep through the day.

Issues faced by persona

It's getting harder for Beans to find a home to rest as trees are being slowly replaced by concrete. Beans does his best to stay out the way of others as other possums are very protective of their established territory.

Motivations of the persona
Potential **Motivators** (habitat) included

Beans usually prefers a place high above the ground away from other species that might harm him. The current alternative of a tree to call home is within rooftops of human structures, finding a small opening like a crack to make his way in rooftops. As Beans is most active at night, he disrupts sleeping humans and this causes humans to attempt to scare beans out of their roof or garden.

Frustrations the persona experiences

Sometimes Beans is captured by humans and is transported to a location away from where he usually scavenges for food and resides. Being held in an enclosure while Beans is transported and being displaced causes great stress to Beans.

Issues faced by persona
Potential **Motivators** (food) included

Most of the time Beans can find food he is familiar with, consuming flora and insects around the in the area located in gardens or in the trees. Occasionally Beans encounters human food and eats it without knowing it may not be healthy for him; sometimes it makes him sick afterwards.

Beans the Possum

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04.6 Persona Design

Emma the Inner City Urban Dweller

Emma is new to the city and relocated for her new job, living in a studio apartment relatively closer than she was previously. Under pressure to make an impression in her new role, she takes short breaks. With her short breaks, she is unable to walk to the nearby park to enjoy her break and walk back to the office in time.

After a long day of work, she retreats to her studio apartment by catching a congested train home at peak hour. Emma feeling homesick misses the open spaces of the forest she used to live by and hike before moving. However, Emma does not have the energy to run to the closest park after her day. She feels like there are not many available locations within the vicinity for her to escape confined spaces.

On the weekend when she does have the energy to run to the park. Emma likes to run with her phone listening to music and occasionally exploring the new area with maps navigating her. One weekend she is caught with her phone on low battery and decides to wait around for her phone to have a decent amount of charge than risk running with her phone on low battery.

Adrian The Proud Homeowner

As a homeowner, Adrian takes great pride in looking after his property mainly tending to his garden. Adrian owns a dog and loves and has a fondness for animals.

He does not mind when possums encroach on his garden and feeds on some of the plants as he has more of his exotic plants in a greenhouse. What severely impacts Adrain's attitude against possums is the damage they cause to his roof as he has to call someone to repair his roofing, costing Adrian money. Adrian is uncertain of the effectiveness of some preventative measures like sealing roof cavities to address his possum nuisances and does not think it is worth the investment. There are not any suitable trees in Adrian's garden to install nesting box for a possum.

The possum affects Adrian's sleep is when he is woken up at the middle of the night to attempt to encourage the possum to leave his roof alone. Laws prohibit Adrian from taking measures into his own hand like trying to capture the possum and relocated the possum elsewhere. Adrian instead has to call a wildlife management agency to capture and move the possum away from his home. This scenario leaves Adrian waiting for proper personnel to handle the possum requiring him to secure his dog to a location at night, so it does not harm the possum at night.

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04.6 **Persona Design**

Florence the Native Flora

Florence is a community of native flora that likes to relax in the sun all day. This community wants to share the love to neighbouring gardens but struggle to attract any pollinators. This community of flora struggle to attract any flora as it is located in a heavy foot traffic area of humans walking by for work. Bees and birds are discouraged from making contact with this community of flora due to the presence of humans.

Buzzy the Bee

Buzzy the bee is an urban dweller. He loves to pollinate native Australian flora that has not been sprayed with nasty pesticides. Buzzy is looking for regular native flora to pollinate and to create honey to keep his queen happy.

Loraine the Lorikeet

Loraine the Lorikeet was born and raised in the city of Sydney. It has become increasingly difficult for her to feed on native flora within urban environments. Loraine would love a regular location where she can feed and potentially create a nest for her future family.

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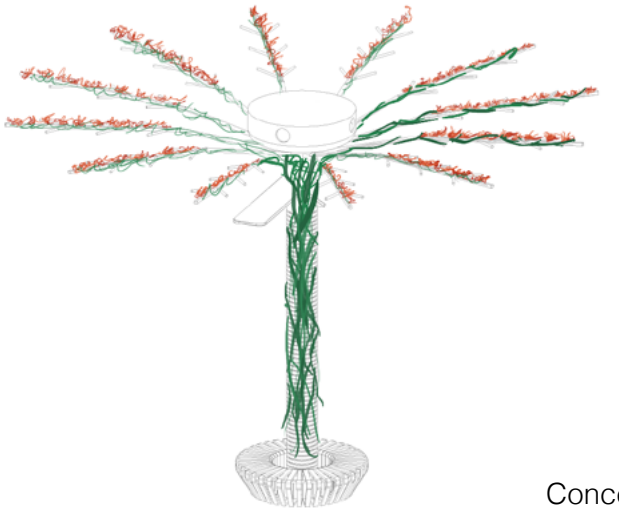
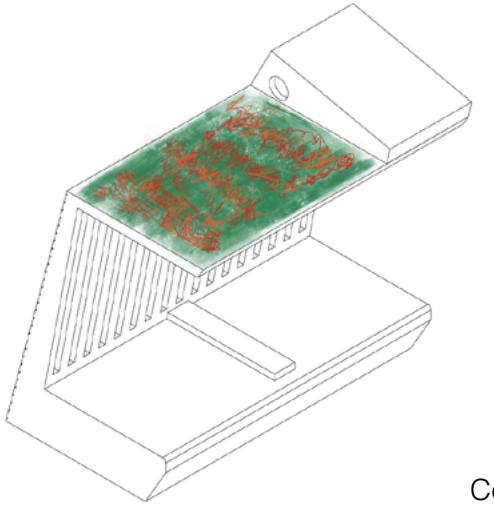
04.7 Initial Concepts

The initial concept design was informed by the knowledge acquired from the literature research. Features were implemented to create a design artefact to address the needs of both stakeholders. These initial design concepts attempt to fulfil a multi-purpose design throughout the day with distinct usage scenarios from day and night. Two initial concepts both taking on different form factors, BenchE more is of kin to existing bench urban furniture previously presented in the literature review. Whereas the other initial concept TreeE takes of the form of a streetlight and inspired by the super trees from the Gardens by the Bay in Singapore.

Both initial concepts provided a similar set of features, for possums included a nesting box to provide an alternative habitat and reduce the number of conflicts between possums and humans. Enticing possums with native plants as a source of food to make use of the nesting box integrated with the design of the parklet concepts shown instead of nesting in roof cavities causing damage to property and disturbing humans. For native plants, both initial concepts facilitated a platform to promote growth and pollination by positioning the native flora higher above the ground away from human activity that may hinder birds and bees from visiting the parklet. For human users, the parklets provided a space to rest and socialise and increased exposure to greenery. Technological implementation integrated for human users included lighting and capability to charge mobile devices wirelessly via a charging pad.



Concept **Tree**E



Concept **Benche**E

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04.8 Participatory Design

Brainwriting and crazy 8s served as excellent tools to generate a range of ideas with brainwriting promoting the collaboration between participants in the participatory design workshop. The persona critiques generated further perspectives with the inclusion of non-human personas. Contributing additional areas to consider for the design of the parklet moving forward. One issue that was raised using the bird persona mentioned a potential conflict of interests involving the possible impact of wireless charging pads with birds. Since wireless chargers charge mobile devices through electromagnetic induction, the concern was around the further contribution of electromagnetic pollution in urban environments. As birds used the Earth's electromagnetic field as a compass for migration, the addition of electromagnetic pollution from potential sources such as wireless chargers could impact the interests of birds (Balmori, 2009).

*To view the raw data from the participatory design workshops refer to **A1 in the appendix***

04.9 Thematic Analysis

The research data that was included in the thematic analysis were from the following methods:

- Show and Tell
- Questionnaire
- Persona Critiques
- Interview

Excluded from the thematic analysis were brainwriting and crazy 8s activities. As the Show and Tell exercise from the participatory design workshops gave participants time to present and summarise their ideas generated throughout the previous two exercises to reduce repetition of data when interpreting the data through thematic analysis. The data was analysed from a bottom-up approach to create codes from reoccurring details. From the generations of the codes, themes were developed as the heading to organise groups of relevant codes together.

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04.9 Thematic Analysis

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Below were the six themes and the number of references associated with each theme.

*To view the data analysed and codes generated through thematic analysis refer to **A2 in the appendix***

19	20	29	26	14	10
Material	Product Lifecycle	Interaction	Safety	Information	Waste Management

With the formation of themes, it provided an overview of the research data collected, highlighting the key areas that the next design iteration to focus on to address.

04.10 Inprogress Concept Iteration

The three interviews served to provide critique on the current progress and direction of the next design iteration. The interviews included a recap of the initial concepts and an open session for critique from a general view. A hand sketch of the direction was used to present how the themes have directed the next design iteration. The feedback provided were in line with the themes with references concerning the material, product lifecycle, interaction and safety aspects of the current design.

*To view hand sketch refer to **A2 in the appendix***
*To view interview transcripts refer to **A2 in the appendix***

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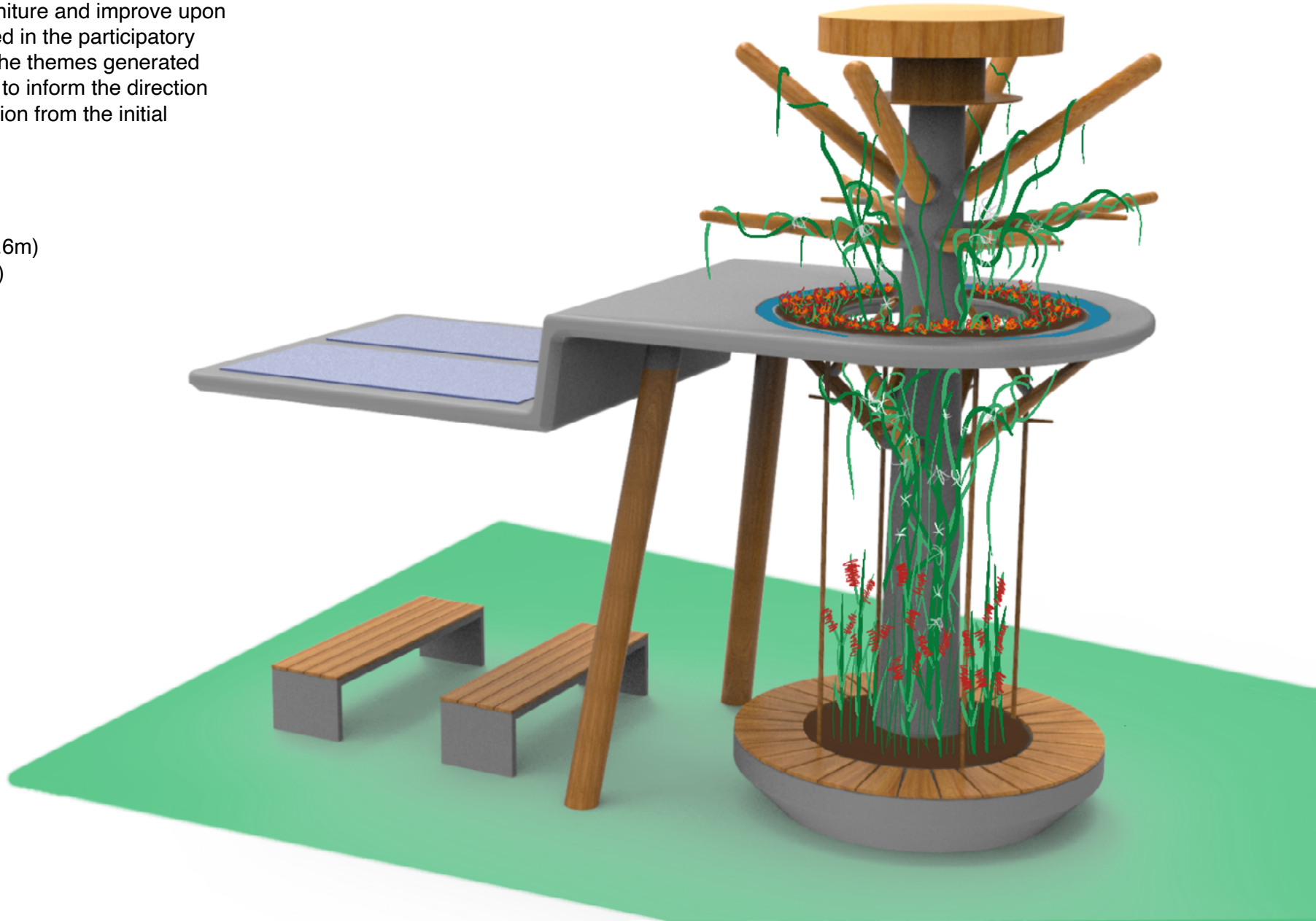
04.11 Final Concept Iteration

This iteration seeks to address the shortcomings of existing smart urban furniture and improve upon the initial concept presented in the participatory design workshops. Using the themes generated from the thematic analysis to inform the direction and focus of the next iteration from the initial concepts.

Design Parameters
Spacial limitations (6m x 2.6m)
Height of Nesting Box (4m)
Self-contained

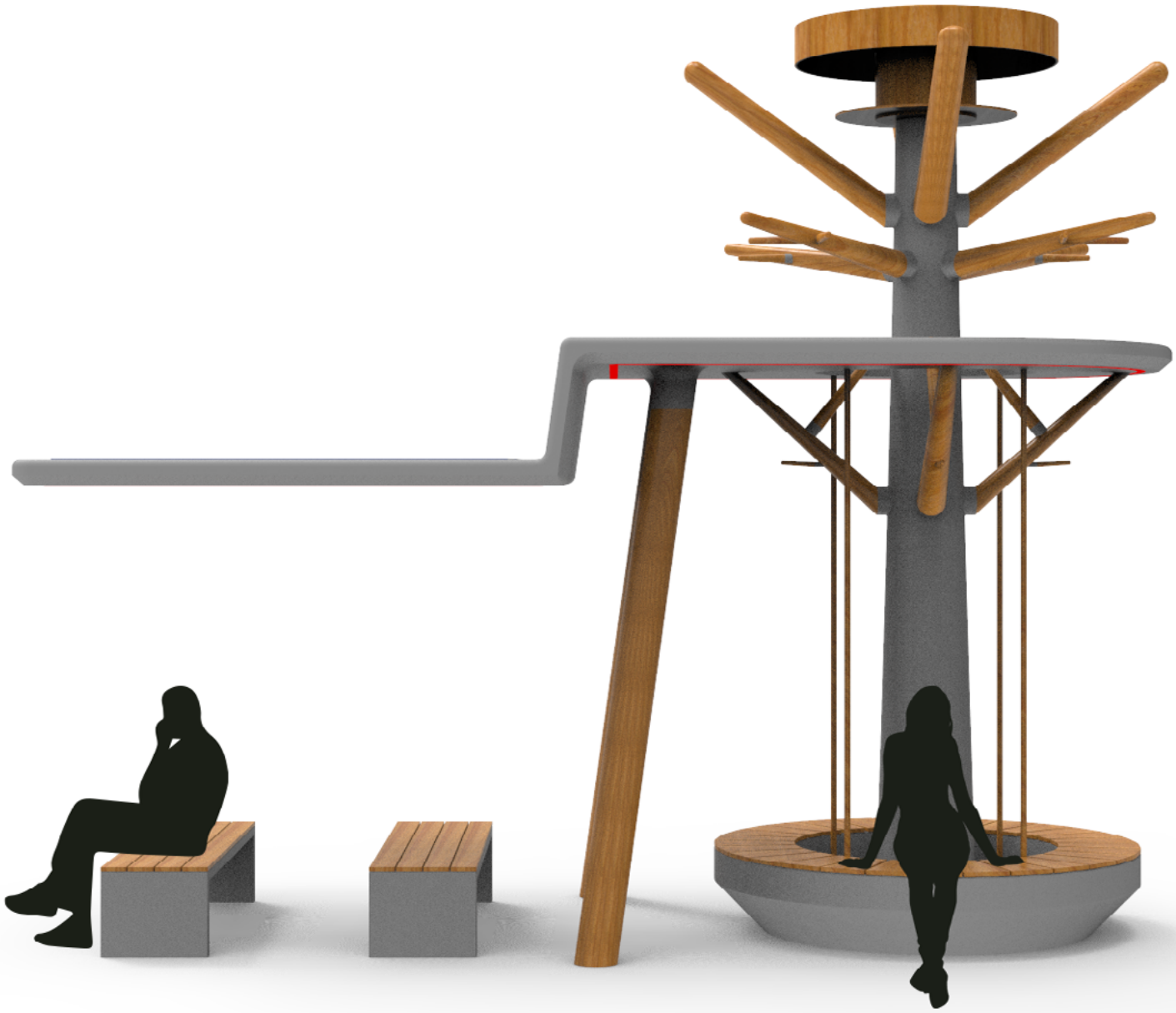


Artificial Parklet

04.11 Final Concept Iteration

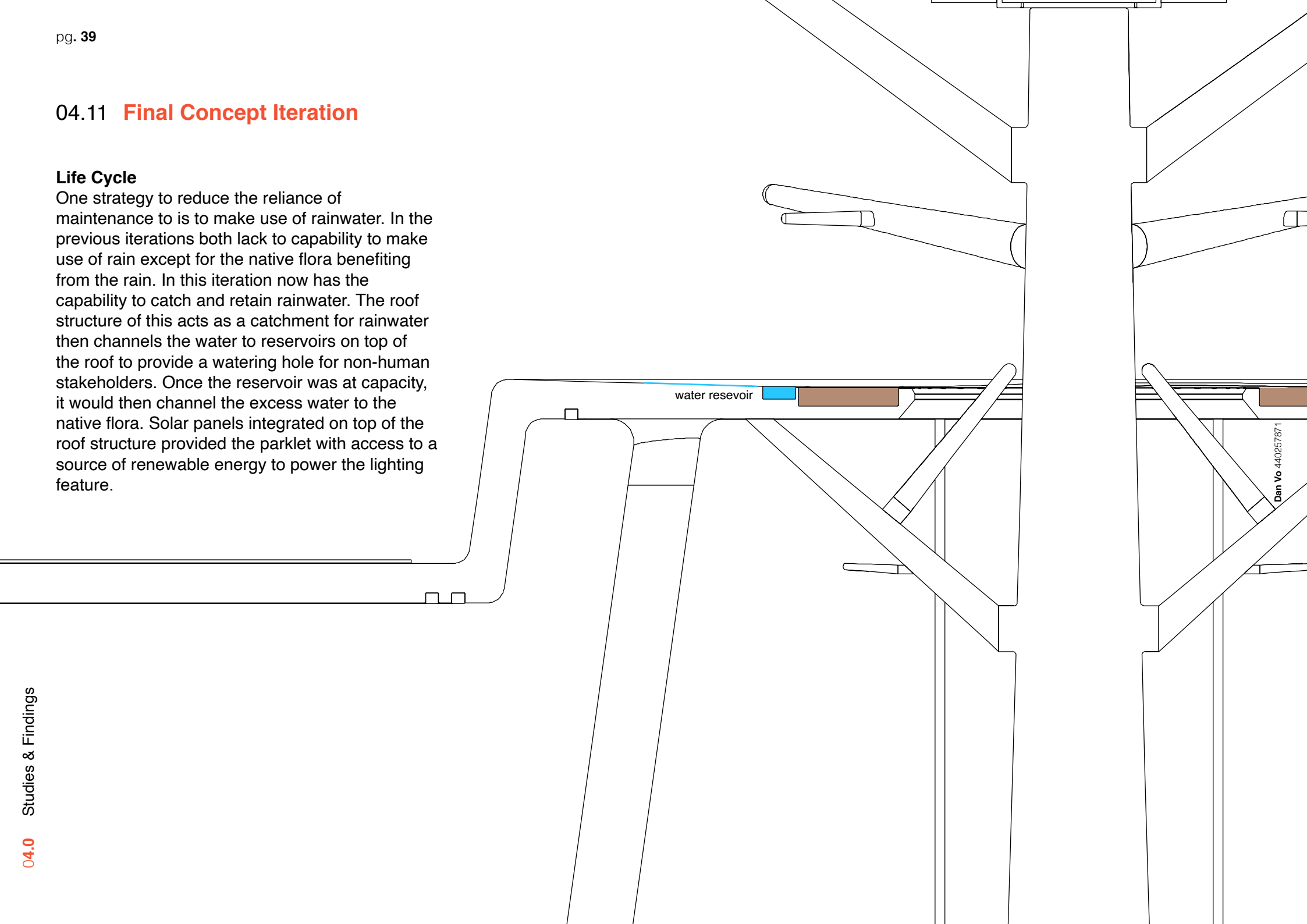
Materials
The initial design didn't have any strong material preferences and was designed with steel for its structural properties and durability. This iteration, however, gave wider attention and reasoning for why certain materials would be selected for, instead of solely focusing on structural integrity. To provide more comfortable seating arrangements for human users in the Australian climate, wood was chosen instead of steel since it was a poorer conductor of temperature.

The updated seating arrangements provided more options for human users. Enabling users a seating preference to sit facing with each other of away from each other. Wood also provides more opportunities for possums to grip on to surfaces when climbing in this iteration of the parklet. The use of wood would however make it more difficult to clean after acts of vandalism such as graffiti.



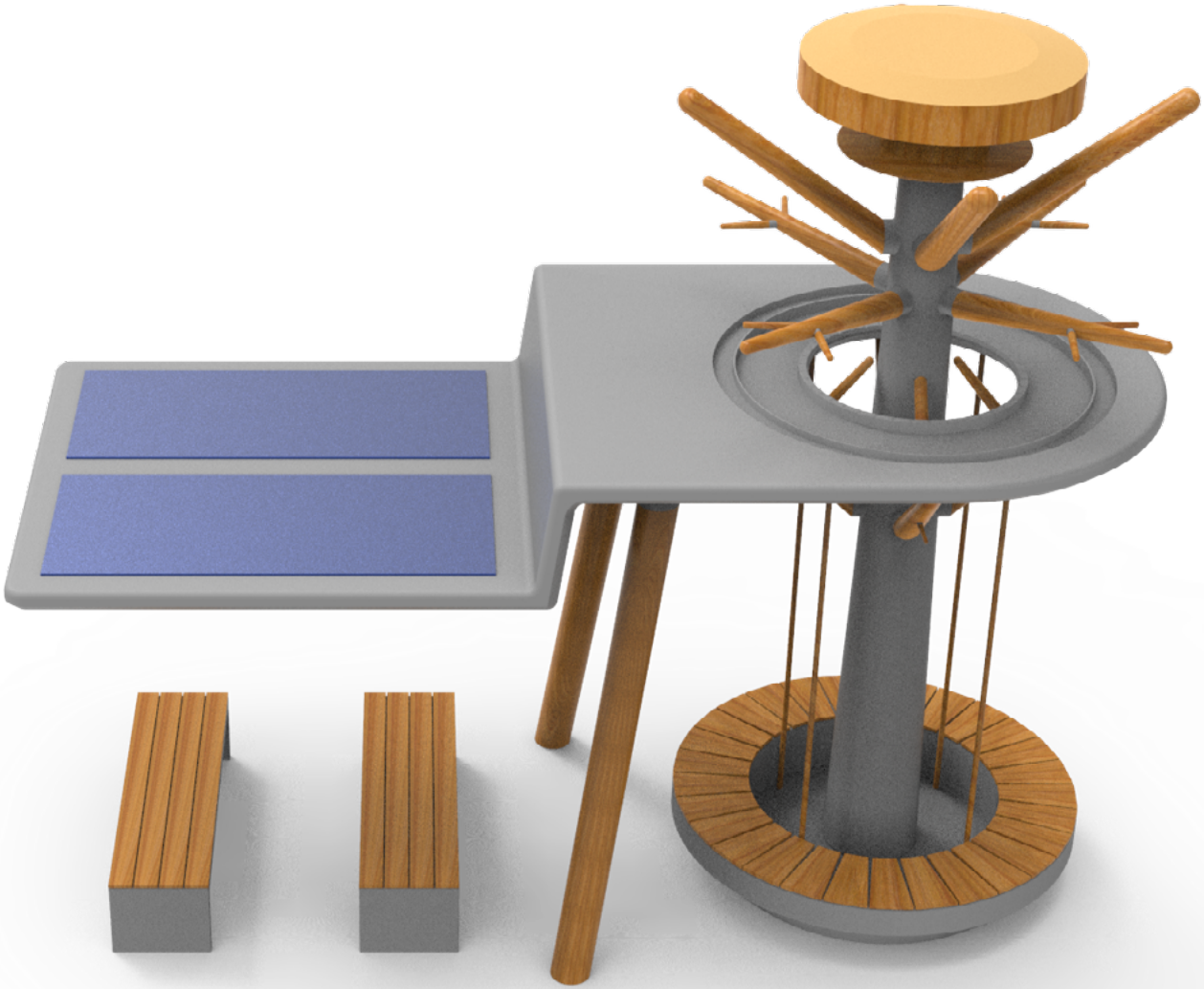
04.11 Final Concept Iteration

Life Cycle
One strategy to reduce the reliance of maintenance to is to make use of rainwater. In the previous iterations both lack to capability to make use of rain except for the native flora benefiting from the rain. In this iteration now has the capability to catch and retain rainwater. The roof structure of this acts as a catchment for rainwater then channels the water to reservoirs on top of the roof to provide a watering hole for non-human stakeholders. Once the reservoir was at capacity, it would then channel the excess water to the native flora. Solar panels integrated on top of the roof structure provided the parklet with access to a source of renewable energy to power the lighting feature.



04.11 Final Concept Iteration

Safety
Climbing features intended for possums in the initial design could be potentially be climbed by young children. The main tree structure is mostly a flat surface at the lower part, smaller wooden support structures provided a climbing feature for possums.



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05.0 Discussion

This research dissertation, the process of designing smart urban furniture was used to investigate the viability of incorporating the three strategies aimed at improving cities integrated into a single cohesive design. Participatory design methods were used to involve a range of participants to expand the knowledge base of the research.

From the literature review, discussed the human-centric applications of technological implementations. The design artefact generated was informed by research from the literature review and participatory methods aligned with the discussion on technological implementations as human-centric. The concerns raised about the use of technological implements conflicting the interests of non-human stakeholders was a reoccurring theme. Compromises were required to be made like the removal of wireless charging pads to look after the interests of birds and reduce further electromagnetic pollution to the urban environment.

Introducing additional measures to maintain the lighting feature by incorporating sensors to respond to the level of human activity like that was presented in the literature review with the IntelligentCity lighting network. Implementing further measures including a change to the roof structure to act as a barrier to reduce the artificial light pollution. The usage of two set of colours for lights was also adopted red and white LED lights. Red lights in an idle state when human users were absent provided visibility at night and white lights were only active when certain sensors threshold were met like weight sensors in seats.

In the literature review, parklets were found to be places exclusively for human usage. Although the use of greenery was encouraged there were mainly just aesthetic and served little to no other purpose. This design artefact seeks to build on the greenery used in parklets as exclusively aesthetic. The selection of the flora was informed by the literature review of green spaces where they also serve as bio-diversity preservation tools in urban environments. Native flora was selected to attract native fauna to restore the bio-diversity of the area. Using native flora would also reduce the reliance of maintenance from human stakeholders to sustain them. The parklet attempts to address the lack of environment opportunities within urban environments by compensating for the lack of habitat for possums, source of food and pollination opportunities.

The research methodology, participatory action research provided opportunities for research data to be actioned. This cycle of self-reflection on the research data with a collaborative approach was key for the generation of design iterations. Through participatory design methods it enabled voices to be heard from all participants in the design process, contributing their discipline and social practice to build the knowledge base of the research.

The contributions to knowledge this dissertation presents is a design artefact in the form of a parklet that incorporates the three strategies aimed at improving cities. The design artefact demonstrates the viability of all three strategies integrated into one design. A design approach is also presented as a contribution to knowledge as a shift away from human-centric approaches to one that considers a holistic approach with the greater world. This research offers a new perspective of designing urban furniture, that highlights the significance of the inclusion of non-human stakeholders and the initial complications involved.

06.0 Conclusion

This research dissertation sought to answer two questions:

Research Question 1 (RQ1)
How can smart urban furniture be designed for non-human and human stakeholders to reclaim urban spaces and create greener co-existing spaces in urban environments?

The approach to answering research question one involved a review of current strategies used in urban environments that aim to improve the liveability of cities. The strategies the literature review discussed were on three topics:

1. **Technological Implementations** - discussed current applications of technologies that sought to improve the efficiency of cities and that they were human-centric and lacked consideration for non-human stakeholders.
2. **Green Spaces** - discussed the benefits of green space in urban environments for human and non-human stakeholders
3. **Reclaiming Spaces** - discussed an urbanism tactic to reclaim spaces by converting existing spaces as a strategy to overcome the spatial limitations in urban environments.

Discussing the viability of each strategies' potential as an application to inform the design of a smart urban street furniture for non-human and human stakeholders. Reviewing the capability of each strategy of how they might complement each other in a design artefact that seeks to incorporate these existing strategies. The research dissertation presents an attempt to put forth an approach that seeks to reclaim urban spaces and create a greener co-existing space in urban environments.

Research Question 2 (RQ2)
How can participatory methods contribute towards creating a collaborative design approach that involves non-human and human stakeholders?

The approach to answering research question two involved applying participatory methods as part of the research and design process to facilitate a collaborative environment. Engaging stakeholders as active contributors with a collaborative environment. Accessible methods were employed to enable a range of participants to take part in the participatory design workshops. Personas were prepared for participants to provide agency for the absence of stakeholders, particularly the non-human stakeholders.

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Implications

Building onto the key literature mentioned above. This study presents a design artefact that is a distillation of three strategies to advance the liveability for non-human and human stakeholders in urban environments. Using a parklets as a strategy to expand upon, by introducing more-than-human approaches to consider non-human stakeholders alongside with human stakeholders. A design approach has shifted away from human-centric towards a more-than-human, using personas generated for non-human stakeholders. Introducing non-human stakeholder alongside with human stakeholders in the design process highlighted design issues faced such as balancing features with direct conflict of interests.

The current design concept of a parklet seeks to address the shortcomings of current parklet and smart urban furniture. This current design concept seeks to address the lack of green spaces in urban environments. The current iteration also improves upon parklets as solely social spaces for humans but also now acts a preservation tool for biodiversity, providing habitat compensation for non-human stakeholders. Technological implementations in the current design concept still serve human stakeholders primarily but incorporates the concerns of non-human stakeholders to reduce disturbances caused. The benefits of each strategy discussed in the literature review are demonstrated through the adoption of each strategy as a feature integrated in the design.

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This dissertation research presents a design approach as a preliminary framework to aid future studies designing a smart urban furniture in urban environments with non-human and human stakeholders involved. The design approach recommends a suggested process of phases and recommended actions to advance and revisit phases when designing a smart urban furniture for non-human and human stakeholders.

1

Context

- Stakeholders
- Place
- Technology

2

Objectives

- Increasing Green
- For non-human and human use

3

Elements

- Location
- Material
- Equipment
- Scale

4

Approach

- Participatory Action Research
- Participatory Design

5

Implementation

- Deploying Co-Designed Parklet

Participatory action research required an engaged commitment with participants which meant in this research the participatory workshops weren't scheduled with enough time in between to perform action on the data collected. In this research the first iterative cycle included two participatory design workshops then moved into action phase of interpreting and analysing the data collected. This made the initial iteration cycle require interpreting a larger set of data and follow up interviews were in place of participatory design workshops for the second iteration cycle. For future studies it would be beneficial to have a participatory design workshop then after some time to act on the data to then present the findings in a follow up participatory design workshop for the next cycle of iteration.

The representation of stakeholders was leaning in favour of human stakeholders as the only form of non-human agency present were represented by personas and human stakeholder with some connections. For future studies it would be advantageous to also include a variety of experts to represent non-human stakeholders like biologists and zoologist as part of the participatory design workshops.

R1

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A1

Participatory Design Workhop

This section contains the raw data of the contributions from the Participatory Design Workshop 1.

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	Participant 1 - Ruchi			Participant 2 - Dave			Participant 3 - Gabe		
R1	Benches with lamp posts for the night and nests	Cubical to have private sitting areas covered in vines using the plant a block	Seats with rain shelter The shelter can have a roof top with garden and bee houses	Integrated bird housing within new and existing signage around the park.	Possum and Marsupial Bridges that emulate jungle gyms of kids playgrounds	Interactive activity/gym equipment that powers/rotates/refresh the animal spaces.	** Urban bee farms **	Safe bird houses	Possum dwellings
R2	Solar powered lamp posts		Water catchers	Have a feeding bowl so people walking past can feed the birds	Have information about the animals for the kids		Bee inspired hexagonal structures that provide sculptural and functional sources of honey.	Elevated and seperated by marsupial bridges that embody australian iconic designs (harbour bridge etc	
R3	Visual art - lighting displays - similar to vivid style displays	Power nap pods	transparent roofs to feel more connected to the roof top shelter displays and flora and fauna	Grow edible vines around signage	bridges over the streets and other dangerous urban spaces	equipment generates kinetic power	Extract honey to sell to locals locally sources different gardens with the bee houses	have same shape bridges for humans to walk through	Clear walls, so people can look in.
R4			water catchers to form a pond or a bird bath	Interaction by feeding the wildlife around you	Bicycle paths		beekeeping workshops and community maintenance events	sheltered areas for non urbanised birds to balance avian ecosystem	Accessible to vet services or conservation specialists
R5				garden edible to both humans and birds (berries etc)	existing bridges, road ramps etc can be used to add bird housing		Education about the importance of bees - story time with children	different types of jungle gym structures for the animals	
R6	Exercise bikes and other quip for human powered lighting. feeds batteries for phone chargers.	naturally formed seats from vines and shrubbery					bee feeding stations with some educational info	comfortable seating spots for birds on buildings' railings etc, as they can't use smooth rails	

	Participant 4 - Daria			Participant 5 - Cyndy			Participant 6 - Marcel		
R1	Bus stops already have visitors and very rarely have any greens	Residential building entrances are good places for birds, as they already have roofs for rain shelter. rainwater can be collected as well to water the plants	Parking lots at supermarkets	Meditation Spaces incorporating the natural space and sounds	Quick outdoor exercise spaces - able to be outside and interact with animals/pets	Interactive spaces - learn about the non-humans within that space	Urban Permaculture - Balanced, self sustaining ecosystems. Natural biospheres for non-urbanised fauna	Food gardens - Growing native edible plants for both human and non human stakeholders	Removing concrete spaces - Reducing suburban heating and increasing the shade coverage of natural spaces
R2				running water sound is good to hide the urban noise, so a fountain can be a nice		address signs for resident animals in the area, eg local possum has a post box and some info on it how can you spot it		Community gardens where you are able to interact with the non-humans i.e feeding areas - similar to petting zoos	Big canopy trees
R3	communal veggie gardens watered by leftover drinks from commuters	filtrations sytems to allow bottle refills for people	external veggie patches near supermarket interspersed within the parking lot - promoting fresh and local stock.				petting zoo with plants		
R4	No physical structured bus stop purely hedges etc	Can have hanging gardens watered all along the building sides		Water park for people that channels water to nearby plants.	dedicated compost section from pets for greenery	biodegradble signage boards that respoind to the natural weather, highlighting the natural process.			
R5	Solar powered bus stops - Implant signage into trees or other plants	water features to be more animal friendly as watering holes	cover parking with solar or green materials and reduce heat captured by concrete	Green house have water an high humidity medidation space					Integrated ambient lighting that attracts and manages movements of people and animals within spaces at particular times of the day
R6	Information displays incorporated	Drinking fountains integrated	Bike stands/ charging stations for electric bikes	Larger green spaces to buffer from traffic and pollution	non destructive construction of equipment	Clear demarkated boundaries between human and non human spaces	Kits for people to grow their own garden that grows into seating / tables		Walking on grass Paths made from grass and gardens

flora, possums, bees, birds + humans

Cubical to have private sitting areas covered in vines using the plant a block

naturally formed seats from vines and shrubbery

figtrees are used to make living furniture and bridges in India

Participant 1 - Ruchi

	R1	R2
1	PURPOSE for HUMANS • Napping pods. • Picnic Spot in the city • Private seating	size? Different sizes for different purposes
2	SHAPE Organic, the plant decides the shape	plant growth and plant styles can be used to use as shelter or domes
3	Designed by nature Different plants grow differently so every pod will be different	vines can be used to make closed structures hedges can be used to make barriers
4	No non organic material, hay stacks to lie on blocks of wood to sit on	List of materials that can be used some non organic material might be used in the beginning to start the structure but then removed and reused in next
5	lighting through lighting openings only sun Maybe mirrors to make it brighter	Fire flies for lighting lol water bodies to pass light through give cool visuals FROM DAVE: Lamps and sculptural vessels filled with water that contains bioluminescent algae, moved with exercise bikes, would look amazing at night. https://abcnews.go.com/International/video/beach-glows-bioluminescent-algae-57348907
6	Animals introduced and convert the spaces into habitats.	using specific plants to attract specific birds and bees
7	Document the growth and display the stages have flowers that bloom inside and outside	Allowing people to water so they feel they are contributing provide people info on when the plants are going to bloom etc
8	NEED TO protect from rain either not usable during the rain or use something that can natural make the rain water flow to the sides.. collect the rain?	Waterproofing BYO umbrella haha rain forests can be an inspiration

Bee inspired hexagonal structures that provide sculptural and functional sources of honey.

Participant 2 - Dave

	R1	R2
1	translucent materials to show off the honeycomb structures within	These are ideally glass or tough pyrex structures, supported by polished/gleaming metal frames.
2	mechanical movement sourced from nearby exercise bikes allowed honey to be moved around the structure.	Moving parts are visible inside, providing education experience and understanding of mechanics and motion to aspiring local youths.
3	scoreboards for local contributions based on energy input.	Score boards are made with biodegradable materials, highlighting the temporal spirit of nature and that nothing lasts forever.
4	weekly giveaways of produce to the winners and/or local stores.	celebrated with a weekly tournament on the bikes, each sunday.
5	local artists and sculpters provide new and evolving designs for the park..	money made from honey allows for local artists to get compensated?
6	previous sculptural beehives are replaced and auctioned off to local parks nearby. money raised funds park maintenance.	this process is governed by a local body/panel of citizens to ensure efficiency and trust.
7	animals are fed with surplus honey	pretty sure birds love sweet stuff, so coat some of those seed-feeding bad boys in some honey.
8	Honey is on tap for all who visit, providing gleaming golden and crystalline structures of honey goodness to all who visit!	tourism and local interest increases, benefiting local businesses and communal spirit.

Participant 3 - Gabe

	R1	R2
1		
2		
3		
4		
5		
6		
7		
8		

external veggie patches near supermarket interspersed within the parking lot - promoting fresh and local stock.

communal veggie gardens watered by leftover drinks from commuters

Participant 4 - Daria

	R1	R2
1	rent a spot at your local Coles' parking lot to grow your own veggies	parking spot @ supermarket -> rent a spot to grow veggies -> get free veggies -> easy to pick up regularly
2	a sign and a funnel to recycle water from bottles to water gardens	I actually do that at home. A garden near gym, stadium or commuting spot can have this to utilize water
3	promote new varieties of edible greens, sell seeds	promotion stand @Bunnings with seeds and plants to attract bees, birds to your garden
4	show off organic veggie supplier by sponsoring a park	Veggie supplier teaches urban gardening and the importance of pollinators
5	community composting station	as city dwellers don't have space for composting, they can do small amounts of composting at communal spaces to feed the garden
6	bird bath and drinking fountain for humans and animals	especially during Australian drought periods. As parks are deserted in the night, wildlife can take advantage and have a drink
7	feed leftover grains from the grocery to birds	supermarkets and grocery shops can set up a feeding station for birds from leftover/spilled/expired grains
8	bee feeding syrup stations a place to safely contemplate bee behaviour while they are feeding	rent a bus stop to plant your garden here -> use existing gardeners from community

Meditation Spaces incorporating the natural space and sounds

Participant 5 - Cyndy

	R1	R2
1	Augmented reality headsets for visual and audible experience	Visual and audible may be of art installations around the area close by promoting local art installations
2	solar powered lighting / fairy lights on a timer as part of the meditation	Bring your own lights to add to the display, creating a interactive space
3	snooze pods for a quick power nap - incorporating the augmented reality devices	incorporation of audio experience in the snooze pods - nature sounds
4	Education on meditation - guide meditation sessions (live sessions)	Ted Talk style sessions within this space - might be on the nature that we see/surrounded by
5	vendors selling teas	education on healthy eating/drinks
6	bonsai trees and pot plants	bonsai growing teaching spaces + lessons on meditation
7	visual displays of babbling brooks and creeks/oceans/rainforest	contribute by adding photographs of nature to the display
8	books available on site to borrow on relaxation techniques	add books and take books - free library

Urban Permaculture - Balanced, self sustaining ecosystems. Natural biospheres for non-urbanised fauna

Food gardens - Growing native edible plants for both human and non human stakeholders

Participant 6 - Marcel

	R1	R2
1	Rooftop Permaculture wi	Rooftop ecosystems - for wildlife.
2	Urban Rookeries - Pest control + Fertilizer production + Food production	Community composting/food waste with animal assisted recycling + Farming
3	Vertical gardens on old buildings - Farmable scaffolding	Covering concrete surfaces with a biodegradable material or solar capture device or animal habitats
4	Surrendering abandoned buildings as wildlife sanctuaries	Converting old/donated buildings or Difficult urban living environments for animal sanctuary
5	Portable Greenhouses - Microgardens as a bus stop or landmark	Greenhouses as part of public spaces
6	Urban irrigation - creating clean water for access to all. Artificial rivers/canals?	Fisheries and Aquaponics in Urban spaces using food waste
7	Community food gardens replace grass walkways	Increasing the biodiversity of urban ecosystems to support more diverse wildlife disposable annual park plants are widely used in colder climates to "switch off" the parks in winter, but we don't have to do this in Australia, as there are plenty of opportunities to plant sustainable parks
8	Wind/Solar powered Hydroponics on highrise buildings growing native plants	Using human inaccessible ares for ecosystem development

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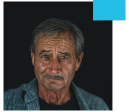
Emma is new to the city and relocated for her new job, living in a studio apartment relatively closer than she was previously. Under pressure to make an impression in her new role, she takes short breaks. With her short breaks, she is unable to walk to the nearby park to enjoy her break and walk back to the office in time.

After a long day of work, she retreats to her studio apartment by catching a congested train home at peak hour. Emma feeling homesick misses the open spaces of the forest she used to live by and hike before moving. However, Emma does not have the energy to run to the closest park after her day. She feels like there are not many available locations within the vicinity for her to escape confined spaces.

On the weekend when she does have the energy to run to the park. Emma likes to run with her phone listening to music and occasionally exploring the new area with maps navigating her. One weekend she is caught with her phone on low battery and decides to wait around for her phone to have a decent amount of charge than risk running with her phone on low battery.



Adrian (The proud homeowner)

As a homeowner, Adrian takes great pride in looking after his property mainly tending to his garden. Adrian owns a dog and loves and has a fondness for animals.

He does not mind when possums encroach on his garden and feeds on some of the plants as he has more of his exotic plants in a greenhouse. What severely impacts Adrain's attitude against possums is the damage they cause to his roof as he has to call someone to repair his roofing, costing Adrian money. Adrian is uncertain of the effectiveness of some preventative measures like sealing roof cavities to address his possum nuisances and does not think it is worth the investment. There are not any suitable trees in Adrian's garden to install nesting box for a possum.

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Florence is a community of native flora that likes to relax in the sun all day. This community wants to share the love to neighbouring gardens but struggle to attract any pollinators. This community of flora struggle to attract any flora as it is located in a heavy foot traffic area of humans walking by for work. Bees and birds are discouraged from making contact with this community of flora due to the presence of humans.

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Beans the possum is usually up during the night while it is quieter and there is less going on around Beans. Compared to during the day when there is plenty of activity from other species, Beans prefers to sleep through the day.

It's getting harder for Beans to find a home to rest as trees are being slowly replaced by concrete. Beans does his best to stay out the way of others as other possums are very protective of their established territory.
Beans usually prefers a place high above the ground away from other species that might harm him. The current alternative of a tree to call home is within rooftops of human structures, finding a small opening like a crack to make his way in rooftops. As Beans is most active at night, he disrupts sleeping humans and this causes humans to attempt to scare beans out of their roof or garden.

Sometimes Beans is captured by humans and is transported to a location away from where he usually scavenges for food and resides. Being held in an enclosure while Beans is transported and being displaced causes great stress to Beans.

Most of the time Beans can find food he is familiar with, consuming floral and insects around the in the area located in gardens or in the trees. Occasionally Beans encounters human food and eats it without knowing it may not be healthy for him; sometimes it makes him sick afterwards.

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Buzzy the bee is an urban dweller. He loves to pollinate native Australian flora that has not been sprayed with nasty pesticides. Buzzy is looking for regular native flora to pollinate and to create honey to keep his queen happy.

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Loraine the Lorikeet was born and raised in the city of Sydney. It has become increasingly difficult for her to feed on native flora within urban environments. Loraine would love a regular location where she can feed and potentially create a nest for her future family.

P : I like that there is help for me to climb up.

M: Could have more shade to walk around during the day (i dont know what possums needs are)

I: whats inside the possum box

P: This looks cool, very modern structure

M : Does possum poop smell?? I hope they clean it.. would they bite me or snatch my food ???

Wireless charger seems out of place..

I : It would be interesting to know what flora will be used , will that be seasonly? would they look good all year?

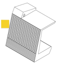
Also how do people get up there for maintenance,

-Ruchi

Concept BenchE

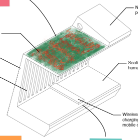
Feature List

- Nesting box for possum
- Platform to hold native flora
- Textured face for non-human users to climb
- Wireless charging pad
- Seating for human users



I really like the full sun here! However, the space for my roots looks too small (and if I enlarge it, it may become too heavy. If I could be another species (climbing) my roots would stay beneath the ground safely.

I like the idea of having the design of the platform area above the user so you feel fully immersed - is it possible to have the space transparent



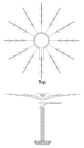
Bit concerned about Inner City Dwelling children climbing on this wall?

I can hear ultrasound, so the wireless charger's sound may drive me crazy and I'll chew it

Concept TreeE

Feature List

- Nesting box for possum
- Smaller branches to accomodate birds
- Larger branches to support native flora
- Climber friendly surface for non-human users
- Lighting component
- Seating for human users
- Wireless charging pad

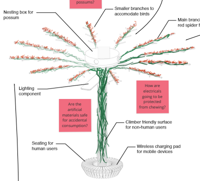


It would be great it this gave a bit more over. looks very sparse

-Ruchi

Are the lights going to affect the nesting patterns for possums?

you'll need to cut me often to keep this tidy shape



I'll definitely invite my friend Flying fox to hang here and poop on humans

People are going to get pooped on

How are electricals going to be protected from chewing?

Are the artificial materials safe for accidental consumption?

Oh, there's no real shadow, I'm slowly roasting and my expensive sunscreen isn't working

How much does a tree cost vs building one of these?

A1 Participatory Design Workhop

This section contains the raw data of the contributions from the Participatory Design Workshop 2.

Emma (Inner City Dweller)

Adrian (The proud homeowner)

Florence (Native Flora)

Beans (Possum)

Buzzy (Bee)

Loraine (Lorikeet)

Emma (Inner City Dweller)

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Participant 1 - Glenda

Light that humans can only see and biomaterials that conduct electricity

R1

1. Is light natural or artificial?
2. Bio-luminescence
3. How do planst, insects, animals perceive electricity and feel internet data and transmissions?
4. light shading that is controlled by humans when they need it onlyfor emergency situation or somethinglinke that
5. Animals turn lights off
6. What else attracts people beyond charging phones to the bench?
7. Community notice board....

R2

1. Natural light only
2. source of food for any of the animals?
3. The bench/bus stop would be about demonstrating the effects of electricity and electromagnetic waves on animals - but without creating any!
5. light switch for animals
6. Information and connection to others - or hunger/safety
7. The furniture could react to the electromagnetic waves in ways that animals do - so it transforms and responds to the environment around it.

Participant 2 - Marcus

Bees use smell / odours / pheromones to communicate with each other. How can this be incorporated into design ideas?

R1

1. Beekeepers are humans who use human percpetion and don't understand the bee language of odours.
2. This could provide an opportunity to use chemical sensors / e-noses to detect VOCs (volatile organic compounds) aka odours and visualise them.
3. Certain honey bee diseases such as American foulbrood and SHB have distinctive odour patterns. This could provide an early warning system to help bees struggling with a pest or disease.
4. Pedestrians and other users could also access this data to better understand bee hive behaviour, e.g. foraging mode / preparing to swarm mode / etc.
5. Unlocking the invisible language of bees would enable a more-than-human way of unlocking the 'spell of nature' – as in: spelling words / the magic spell of the world of bees.
6. 

7. If the data from multiple bee hives is connected and federated, it can create a map of the city and the bees foraging behaviour.
8. If people keep going to Bunnings and buy Roundup, this map of the city will show how it kills bees, as it creates a ripple effect.

R2

1. Examples of the digital tools beekeepers use today to get data: scales to measure weight, mics to monitor audio/buzz, and cameras.
2. The idea of sensing VOCs has been used in the food industry to detect food safety issues. So the technology exists, but needs to be smaller.
3. The visual detection of such diseases is tricky and labour intensive. Oftentimes, humans come in too late.
4. Having a better connection with nature, with the environment, with seasonal changes, floral patterns, growing patterns is much needed.
5. Required reading: David Abrams, The Spell of the Sensuous. He explains it in a much better way.
6. 

7. Having more-than-human maps that display the city and its layers based on a non-human perception would help humans be more connected to the ecosystem.
8. RoundUp is bad and should be banned.

Participant 3 - Linda

idea: footpaths / urban walkways
scenario - thinking about human 'desire lines' vs. bees 'desire lines' vs. possum desire lines'

R1

1. movements between all stakeholders? Possums are easily scared and need a space to hide from traffic/people etc.
2. opportunity to think of a design that allows movements between all stakeholdelrs - this could be interesting as possums movement trails seem spontaneous and jagged compared to humans are quite linear and bees are all over the place
3. 

4. this could create interesting walkways /urban paths ways
5. thinking about how possums and bees percieve light and the environment...
6. humans may take shortcuts and ignore the common path - could be a way to reclaim those unused paths for non-human stakeholders
7. 

R2

1. the could be a walkway or bench that has shelter for possums
2. trail of flora could other detour the bees - opportunity to plan and create desire lines
3. an urban space with multiple components working together a system of bench/tree
4. re-designing the common path
5. bees have a different sense of the world and so do possums (mainly active in nightfall) potentially inform the design work
6. 

Participant 4 - Callum

Responsive bench that implicitly responds to humans and animals Also contains a screen recommeding alternative forms of transport (walking, etc)

R1

1. The bench has growing vegetables that people can take with them
2. The bench branches move based on the Co2 emissions
3. A physical transit display over an LED one to reduce light pollution
4. Native animal sounds from that area
5. 

6. 

7. Solar panels to provide energy for warming the vegies and the animal nests. Prioivide power for physical display.

R2

1. Fruit and vegies grown here. Community members can plant their own in a vertical planter.
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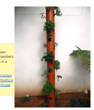
3. BUS - 7 mins / Walk - 10 mins (X amount Kj burned)
4. Insects, etc
5. Branches droop when Co2 levels are high in the area
6. Branches straightened and higher when Co2 levels are lower
7. Seats have peddles and people can peddle to generate power for the seat. System notifies the user how much energy they have generated while seated
8. along with Kj burned.

Participant 5 - Martin

Park benches that grow and dispose over time

R1

1. Use some sort of mushroom material
2. Maybe they use seasonal materials
3. The material is also a food or nesting source for birds - that way the entire bench eventually decomposes and is fed back into nature.
4. Might need someone to maintain the benches
5. Safety might be an issue. What if you sit down on a bench it collapses.
6. Use a material that has a natural glow at night - also adds to safety
7. Embed seeds in the park bench so that when it decomposes, it turns into a native plant
8. Maybe people can take benches also home, or move them to another place. Where they grow might also align with human/non-human desire lines.

R2

1. Different mushrooms may grow differently depending on the season. Example: Terreform designed a chair that grows and can be decomposed.

2. We need to ensure that they have a useful lifespan. They might take a year to grow but then last 2-5 years.
3. This could be a way to maintain a certain shape or height of the bench, as it grows, birds keep chipping away on it.
4. What if the bench is also a bin - people can dispose their rubbish and the rubbish feeds the material that grows the bench.
5. Solution for this problem: Use a material that changes colour over time. E.g. when it turns purple = no longer safe to sit on
6. Use inspiration from fireflies or the algae that glow at night
7. Maybe the bench as it grows captures seeds from nearby native plants. As it decomposes those seeds are released = full ecosystem.
8. Have a crowdsourced approach to "planting" a new park bench

Participant 6 - Marius

Robots that help toads to cross streets

R1

1. robot can lure toads through sound smell
2. people can interact with the urban toad robots (e.g. when the robot needs help)
3. robot build from natural biodegradable materials
4. various levels of agency: robots supports non-humans (animal), humans support non-human agents (robot)
5. 
6. what if the robot kills the animal?

R2

1. or sound? research on what can lure toad
2. communicate to people through implicit cues? is there a "champion" that is responsible for the robot
3. can all parts of a rigid robot be biodegradable? soft materials?
7. which speed of the robot is acceptable for not disturbing the "natural flow" of non-humans

Participant 7 - Stuti

Bus bench or park bench

R1

1. Native plants
   - Watering
   - Xeriscape
2. Human Interaction with bees?
3. Maintenance
4. Excessive bees - safety?
5. Cultivation of honey?
6. 

R2

1. Roof
2. How to manage bee stings? Phone and bees issues needs to be considered.
3. - High maintenance? Expenses ? Who pays for it? Easily destroyed by people ?
4. Allergic reactions?
   - Supervised growth and habitation - does control growth help?
5. Example - Vancouver Convention Center- though project scale is totally differernt

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Plus
Minus
Interesting

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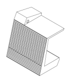
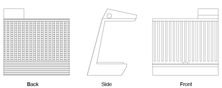
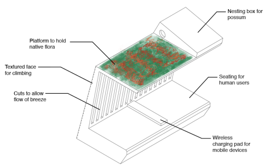




I like the look of this bench and its handy to charge my ohone and makes me feel good becuase it has considerations for possums

I don't like the sounds of people sitting there they never shut up and are always looking at that thing in their hand

P: Possums are territorial and running out of natural tree hollows, so having more nesting boxes is great.
N: If it's close to a road, it may attract possums onto the road and get killed.
I: The opening of the entry hole determines which possums will use it. Different sizes for brushies and ringtails. Beware of other intruders... cats, rats.



The way humans perceive the urban environment is usually strictly delineated into private spaces (home owners) and public spaces (Council property). Nature doesn't see it like that. Could some of these designs be interwoven/connected with each other, e.g. Emma might provide the nesting box and the Council the landscaping to provide food.

I'm a city bee who likes jazz and I really appreciate having these type of flora in my bee commute to pollinate although these pestering humans keep trying to swat me away, are we invading their space?

P - I like the green roof and it would be pretty cool to have something like this as my home.

N- I would be afraid/ annoyed to be so close to the humans.

Possums eat a lot, so the plants that grow on the roof must be very resilient, low height, and not something possums eat, otherwise it'll be gone overnight.

Why do we need charging pads, people are on their phones enough

Concept TreeE

Feature List

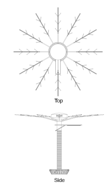
- Nesting box for possum
- Smaller branches to accomodate birds
- Larger branches to support native flora
- Climber friendly surface for non-human users
- Lighting component
- Seating for human users
- Wireless charging pad

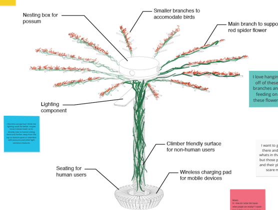
European Honey Bees in Australia have the natural instinct of preparing for winter hibernation, but winter here never comes. So they forage all year and need flowers/nectar food sources all year. So the planting should be diverse so different flowers are in season across the year.

Possums like interconnected branches so they can jump and have multiple escape pathways. Perhaps the 'branch' / tree design should mimic more a natural tree, and connect with other trees nearby to avoid the possum moving down onto the ground where it is dangerous for them.

I want more flowers but this is good

Beans:
I like the nesting box but I'm not sure if it'll fit my family? what if we don't get along with neighboring birds?





I appreciate the seating space, the design is good, although I am allergic to bees

I love hanging off of these branches and feeding on these flowers

I like this concept but I think the lighting could be better ..maybe move it down lower so its directly next to human sitting there and farther away from the top so doesnt upset or interfere with possums and other light sensitive creatures.

I want to go up there and see whats in that box but those people and their phones scare me

Beans:
N - How do I enter the house when people are nearby? I would hate it if they try to get rid of me while I try to enter my house.

A**2**

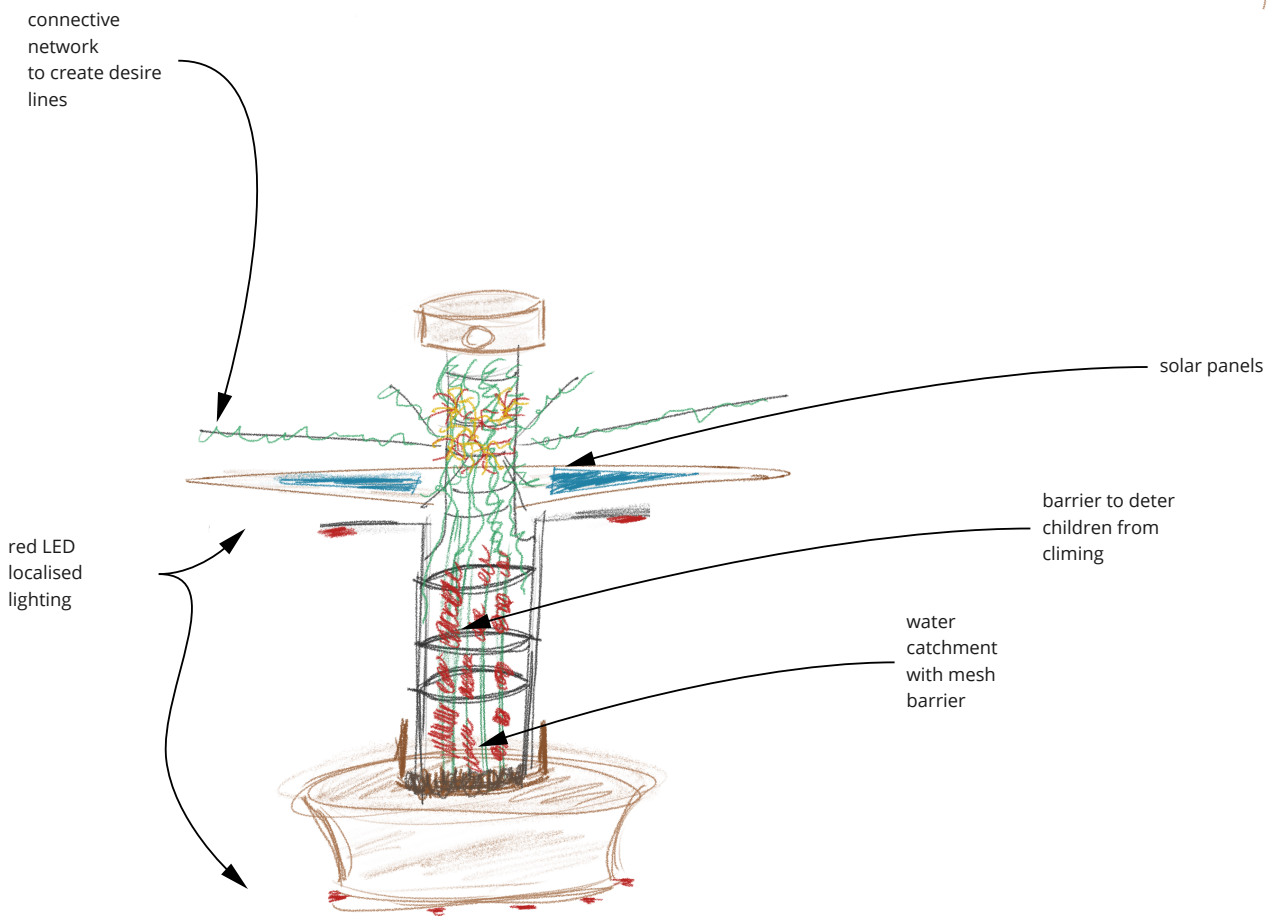
Thematic Analysis

This section contains the analysis of the following data:

- Themes and Codes
- Inprogress Concept Iteration
- Show and Tell - Transcripts
- Interview - Transcripts
- Questionnaires
- Persona Critiques

Dan Vo 440257871


19
20
29
26
14
10
material
product lifecycle
interaction
safety
information
waste management
biomaterial
maintenance
promote community enagagement
dangers of road
education
composting
multi-purpose
power
interaction concerns between stakeholders
consideration of young human stakeholders
data gathering
vessel to capture water from bottles
source of material
produce consumable
distancing from stakeholders
features that conflict with other stakeholders' interest
repurposing
carbon footprint
site attraction
facilitating different interactions
nesting location
structure
incite interest


connective
network
to create desire
lines
solar panels
barrier to deter
children from
climing
red LED
localised
lighting
water
catchment
with mesh
barrier

Show + Tell

Thu 21 - May - PD Workshop

Abhiruchi C
Yes, I think I just started with like having more like, I just went furniture I was, I went back to seating and stuff more than I was initially going towards lamp posts, but then I was like furniture, probably like sitting tables, blah, blah. So I kind of came back and then I was thinking how plants can give you cover, and then he could make a private area. So that's how it started. And then I thought of it a bit later, but then realize that I think Dave wrote it as well that the plants can naturally form seats and stuff. I think wrote it in someone's comment as well sounds like Ah, that was like, I think that kind of thing saying, yep, I'm doing this to rock and roll. And then, um, do you want me to talk through this stuff I kind of was talking about in the crazy eights.
Yeah. So tell us tell what what you're what like what idea would you like to take and now like, so then I think I started once it was like, What structure like you can use the plants to make structure. There was one was like what could people use this for? And then what kind of plants would we use? Maybe we don't have any non organic matter only have natural materials. And then I was thinking that maybe in the beginning you can have some like, you know, metal posts and stuff you might need to kind of form the shades but take them out and reuse them for the next one you'd build. And then I would like templates almost. Yeah. And it's just more like you're not producing more non organic material you're just you know, reusing it once that phase is over extended several years and then I think there was another idea. Oh, I was thinking about lighting and I was thinking about how we could like we might have to go back into nature and think about how we can make little you know opening so that sunlight can come in so that we don't use any electricity and stuff in there somehow. So I was just going super like no no manmade or non organic matter and going in going that rain was a thing it was like I made more money use it during rain, or we let people bring their own umbrellas or find a waterproofing but I was like, it would be nice like rain is like a refreshing like a rejuvenation time so no people come in, it's raining, the plant can grow and breathe. So it's like a let the let the structure rest sort of thing as well. So I think I was going on those train of thought so, and the fact that different plants grow differently might mean that they all afford different shapes and different purposes at the end of it. So, you know, if they open up or they close in, or hedges, you know, hedges might be just to make walls but then more winds and stuff can go into structures, but that I leave it at, but that's where I was.

David L
I jumped on the Bee idea one because I love honey and my spiritual animal is Winnie the Pooh. But also but also because I thought it was frickin amazing so I thought these big translucent like sculptural idea these like sculptural beehives that were were you could see through them so you could see the bees making the honeycomb inside of a glass so that they wouldn't yellow in the sun and and you know that that has some nice like metal frames for some support or that they're not gonna get knocked over and just shatter on the floor. They'd be they'd be locally sculpted or sourced by like, like sculptors so that they are but artistic pieces as well. mechanical movement nearby could allow for little mechanisms inside these, these glass beehives to move the honey around to a spot where someone could turn on a tap and actually have some of that honey come out. Then I thought about the exercise bikes and how you could put like a scoreboard for local local competition. And like logging the contributions from people based on energy input and in my second revision, I thought about how those scoreboards could be biodegradable, highlighting the the very temporary nature of of these materials and that nothing lasts forever in nature. You know, things are meant to mean to move on. And then I thought about weekly giveaways of produce like that honey and so forth to the winners of those competitions, either local stores as well celebrated with a weekly tournament on on the bikes each Sunday just like a sporting kind of day, like down at the oval. local artists and sculptors provide new and evolving designs to the park and the old ones are auctioned off raising money for Park maintenance. Money made from the honey is also put into that as well. The process is governed by a body of citizens to ensure efficacy and trust. Animals are also fed The surplus honey, and you can just bang that onto some, you know, those those those seed feeding things because there's birds love that stuff. And then honey is on top of all who visit providing gleaming golden and strict and crystalline structures of honey goodness to all. Yeah, that's it, and tourism and local interest increases benefiting local businesses and communal spirit.

Daria P
Yeah. All right. Um, I couldn't really choose much because someone has generated two very beautiful ideas. One about feeding leftover drinks, to the gardens. And I immediately recognize this idea because that's exactly what I do at home. You know, these water bottles that keep piling in your car. And one day, you just think you just realized you need to tune in you need to clean them and you don't drink this water obviously. But I have a have a big pot plant that loves to accept all of it. So it's a it's actually a good idea. To, for people to contribute to the gardens. So if they have leftover water, it's a good idea to recycle it and they feel the connection to the contribution, contributing something. And another idea is, it couldn't be a good a good spot near a gym or stadium or some community space where there are a lot of people with water bottles. So they just don't pour it into sewage but instead here another one is about making a community community run composting space because many of the city dwellers, even if they want to compose something, they don't have any space for it. So if they could just throw their banana peel somewhere to feed the garden, it could feel like a contribution. And nothing is our thinking about collaborating with grocery stores and supermarkets as they already have.
They need to stock plants and vegetables and green. um they get there there's one video to from the from the presentation about renting a parking spot. So for example we've been ready to rent a parking spot at a local Coles and they will grow vegetables for you at that spot so you can go there every time and collected together with all the other groceries and the washing powder. I actually saw birds in the in the grocery store I'm not sure it was Australia maybe in Australia food safety doesn't allow that but they surely have grain spills and leftover stuff and the expired grains so it can be fed to the to the birds because to be wasted. Yeah, nothing about the water a drinking fountain. Which is suitable for humans and animals and a bird bath. Maybe it can work in summer because it's quite hot and dry. I've had some ravens come to near my house that looked very thirsty. And they actually accept water from humans. So it could work. Yeah, these are all the ideas. I also found some reference for the Ruchi's ideas for the living furniture. There's some traditional practice in India, apparently, to make living structures from factories.

Cyndy R
I yeah. So my idea was I'm deriving from a space where people could come and sort of meditate And relax, maybe have power nap. Because I know like in workplaces, you have sort of snooze zones together quick power nap an afternoon. So having that outside I think would even be better. So it would be a connection of technology, art and nature. So I guess you would have like an augmented reality where you could drown out all the sound of traffic and other people and try to have a bit of a audio visual experience, but also promoting local art within the space. So maybe like little ads like, you know, this is you just saw this and comes in in real life. Yeah, And also adding in spaces where you can educate people on meditation. Healthy Living. So yeah, like Ted Talk style sessions, potentially bringing in people, experts in the fields. And if you wanted to add in a commercial aspect to it, selling healthy teas and food that helps with the overall experience of relaxing and meditating.

Marcel G
um, yes. So my idea is I'm around increasing spaces for the non human stakeholders so they can have a bit more sustainable representation. A big problem with the current urban green ification movements at the moment is that they don't take into account the sustainability factor of the ecosystem. So for example, the Central Park building that's just over there. They don't actually, those plants aren't self sustaining, they have to replace them almost monthly because they'll die because they weren't selected for. That's terrible. Yeah, they they weren't selected for their sustainability or the way they can greenify they were just selected because they're colorful and pretty. And a big factor in a lot of other urban environment schemes is that there's so human centered that they can't sustain themselves. So increasing the permaculture factor will mean that the upkeep for these spaces is reduced, you can have more of them and they won't need to be maintained as much. You'll also have a wider variety of urban wildlife that will keep down the pests like pigeons and rats. So we've got urban rookeries. So you can have spaces like they have this in New York City actually where they have spaces for Raptors and other birds of prey to keep down the pitching population. And where there are pigeon populations, you have centralized points so that you can collect the manure from the pigeons or feed the pigeons food scraps and collect them in year two, turn it into fertilizer and that goes to Central Park or converting like vertical wall spaces. Concrete spaces, especially in urban environments. That's why we shift into glass trap a lot of heat from the sun which raises the overall area temperature. So you want to cover those with climbing plants. Or step them out with urban gardens. And you can also plant food in these urban gardens as well. Food for both humans and wildlife. surrendering abandoned buildings so much, much like they'll sink old ships out to create artificial coral reefs. You might if a building is condemned and no one wants to develop it or if an area is not desirable for humans, you can partition and surrender that section for wildlife and bring experts in to convert that into a more sustainable natural space. Like incentivizing people to convert, which is otherwise unusable lawn space because lawns are actually very wasteful, they they suck up a lot of water. They patch soil and they don't actually give anything back in terms of natural spaces. So create a community incentives or modular consumable solutions to encourage people to grow either natural flora and fauna or agricultural goods in their own backyards. Or we can take studies from the way the Japanese cities are designed and that they've integrated irrigation and river systems. into the natural urban environment. So cities like Kyoto and Osaka actually still have their natural waterways moving through them and they have an aquaponic ecosystems living in them. So they use fish, for example to filter out waste, and sewerage. They also, they're also fishable. And it increases like the natural bird population. If you go to Kyoto city, you'll actually see eagles and Rennes just like walking around the city. Yeah. And then the last two are more about replacing Public Walk workspaces with publicly funded food gardens or using the wind and solar panel. Wind generated by like wind moving through high rise buildings to generate power and using that power for making money More lighting or hydroponic growing solutions.

Fri 22 - May - PD Workshop

Martin T
Okay, so my concept was the idea of park benches that serve humans, but those are serve nature because they're sort of like a feeding ground for birds. And they can also contribute to the natural habitat so that idea is to use particular mushrooms that grow over time. They could also be designed so that captures seeds of plants of native plants from nearby and them trap those seeds over time and it probably takes about a year for them to grow. And then they last for about two to five years. They decompose over time because there's natural material, but also, it's using a material that birds can use either to feed and or to build the nests sort of come to the bench, and then so chip away at the bench over time. There's a safety issue in that those benches will collapse eventually and not safe for people to sit on them. But that could be addressed by using certain bio materials to change color. So that for example, the thing turns purple. It's no longer safe to sit on it as it decomposes the seats that have been captured or trapped or released and then start growing into a native plant.

Callum P
Yeah, so similar. I was also thinking of like a park bench with Like that tree idea that we saw earlier, I thought what would be really interesting is to have like, kind of like a community garden where people could plant their vegetables and fruit vertically on the tree trunk. I was also thinking it'd be interesting to somehow incorporate, like, some sort of physical display, like showing us timetable, but also alternative ways you could go. So maybe like recommending or showing the walking is not that much different. also thinking about the branches on the top of the tree, they could drope down when the co2 levels in the area were high, and then straighten when it's lower. And I was also thinking finally that the seats could have some pedals on them. So people could actually pedal and generate power to the seat, and that the system would then somehow haven't thought of that through yet. The system would somehow notify them how much energy they produce, and how many kilojoules

Marius H
Yeah, my idea was around like, there are like this kind of ai to humans help like frogs and toads to cross streets like in particular in springtime when they, when they have when they go on their hikes and the ideas around how a robot could could help them instead of instead of humans. So yeah, and I was like thinking about the concept of interaction between this robot and animals like how can the robot lure the animals to help them to help them but then there's like a also, like, there's a layered kind of interaction or like a dependency like the the kind of the animals dependent on this robot, and the robot might be dependent on the only humans, right? Because the robot needs to move around in this in this public space as well. And so I was more thinking about this kind of dependency between this different agents in public space basically like yeah, okay, how can they interact? And then I was thinking a bit about like different materials and also the, like, thoughts around this the destruction and creation how this maybe belongs together if you think about like, biodegradable robots or materials and maybe how, how destruction is also part of creation for something new and yeah, new new functionalities that might might evolve.

Glenda C
Okay, so my question concept is about. So I'm concerned about how light impacts animals and insects and birds. I'm also concerned about the charging of the mobile phones, if those are they electromagnetic waves or whatever and how that impacts, you know, other that we know that it impacts humans. So that would be some sort of impact on animals. So how could so I was just trying to think through what how do these invisible energies or waves or whatever we want to call them? How are they perceived and how are they felt by animals? And that's something that we don't want, I don't know about. I'm sure other people do. So I was just trying to think, would you then replace those elements with like bioluminescent materials or other sort of more natural ways to create energy or light, but then I thought, maybe the whole bench or bus stop or whatever it was all about demonstrating what that actually feels for the natural animals. So or the, you know, insects. So maybe somehow, the furniture would have to not create any of that, but still demonstrate what that feels like, somehow. I don't know how. So at the end, I think I figured out the furniture could react to the electromagnetic magnetic waves in the ways that animals do. So it transforms in response to the environment around it somehow. I don't know. Does that make sense?

Linda P
So my idea I took out was really interested in movements between all stakeholders and how they all move. And someone really interesting wrote in another post note about desire lines and desire paths of each stakeholder. So thinking about this, the humans common path and then a bee's and possum the way they move. So this could potentially redesign the common path. And as you can see, I posted a photo there where the human actually just takes a shortcut. Anyway, if they're walking home, they go. If there's a it's a shorter way to go home, they will take that path instead of going to the common path. So this could be the idea of maybe thinking about the what happens to the path that's been unused by humans and how could that be used by the non state? The nonhuman stakeholders? Yes, that's and they also perceive bees and possums perceive the environment different way. And so they move quite differently to us. So that's just the scenario that came out of that.

Marcus F
I've picked up on, I think it was in that brain writing idea, something that Callum put up at the top and then Linda commented on, which reminded me of an idea we had about beehives, and that pushed towards a digital beehive. And the starting point is that a lot of the digital beehive implementations put digital devices in there, fair enough, but the data that comes out of those digital devices are based on human perception. So it's about temperature or humidity or, or weight. So it's things that that humans can make sense of, whereas the bees themselves they actually use because it's dark inside. They use odors and pheromones and what chemists called volatile organic compounds to talk to each other. So although they You know, between twenty and sixty thousand bees in a beehive, they're constantly on social media, they have their own Facebook system. So they, they can talk across different levels with each other. And so they know whether the queen is at home, whether she is okay and so forth. So what I thought would be really cool is to try and translate this language of bees like the odour language system into language and data that humans can understand. And if that is actually made accessible in the urban environment, then that could provide an opportunity to have a better connection to nature because it goes back to David Abrams um kind of notion of spelling like that we've those those cultures that have adopted a written language we use the word spell, to spell a word, whereas the the other meaning of the word spell is is magic and The reason why there is that that connection between these two meanings is because originally, the word spell comes from looking at nature and unlocking the spell of of, of nature, which is to understand nature. And so this is what more oral cultures and indigenous people would be much more attuned to, which is seasonality and those desire lines that we just looked at, and being just more in tune with what's happening in our environment. So while we might need to use digital devices to help us understand that language over time, I mean, as a, as a hobby beekeeper, you get much more attuned to that to that other language. And I think that is a skill that is quite essential in the way that we would try and broker a better connection into the more than human world.

Stuti K
So I focused on the bench itself, the bus bench or the park bench. And I just focused on that and created more some more ideas. I think native plants would be an excellent example because they don't need a lot of water. But also I was thinking about how are we going to maintain it because if the maintenance is high, it would be really, really tough to put so much money in it. So would that work? If it's if it's not expensive? I think that will be better. But how do we go about it is something that we will have to look into. Also, we could consider cultivating bees and honey on the roof, but how would that work out is something that we'll have to again look into and I think that is the Vancouver convention center that has done that, but that's definitely a bigger scale. So can we bring that down? And can we do that? And also, if we are having bees and native plants, how would people react to that, especially if people are sensitive to bees? These are the things that I was looking into.

Interview

Fri 22 - May - Gabriel Wong

Dan
What are the aspects of this concept that you like?

Gabriel
I've looked at it so it's just looking at design concept, I think, oh, what I liked about it was basically the fact that you had picked like five distinct subjects, Native Client, possums, bees, birds, and of course it opens all this but I I was interested in why native plants Because that was like, you know, obviously there's a reason because, you know, you're thinking about, you know, within the context of native plants probably have quite Hardy, they are quite what sets us you would think about plot you would think about plan as a native plant is having the right as well to be counted as an environmental object or subject.

Dan
What are the aspects of this concept that need improving?

Gabriel
Maybe the thing is well see helping people understand a little bit on why you've picked each of these subjects. Because a few that to somebody who understands environmental concepts, yes, they would probably go, Oh, yeah, I know. But to people who may not be so attuned to environmental concepts, it might help. Like, for example, I pick bees when I'm working, because I like the idea of bees. Because the idea is that, you know, with increased urbanization, you find that the bee populations are threatened because they don't have access to, you know, the simple example flower gardens and so this impacts on them quite significantly. And in thinking about how do you co design with nature in mind, I think about species that are most impacted so I understand the reason for possums understand the reason for bees and the understand the reason for birds, but somebody may not.

Dan
What are the types of potential scenario(s) where and when this concept might not work?

Gabriel
I think the definition of urban, it's very different for people like, yeah, we we talk about urban within the context of city centers. So for me, it's like I live in city, you know, urban to me is, you know, I, my reference point is what's around me versus if I was, if you were talking to that same example, participant who might be living in a regional city, in let's say, for example, this I hate to use with Newcastle, orange, you know, and stuff like so there, that the concept of urban is very different from their concept urban might be very different from ours. Yeah. So I think that was just maybe one thing, which I thought might be interesting. That challenge if you're going to be expecting participants or some people who are Coming from a different different reference point. The other thing around the design concept is we need to outline challenges. Like, you know, like what some people raised around water recycling, um, instance of maybe into some drier weather instance with climate change, like we take into consideration variables, that drier weather, you know, reduced amount of water being available, right, like that type of the types of environmental variables, we need to think about within the context of how are you designing for an environment that is True climate change as well. Yeah. So just a thought on that.

Dan
How can human and non-human stakeholders collaborate together to design smart urban street furniture that accommodates the needs of each stakeholders?

Gabriel
I think understanding each other's needs I think, you know, if we were coming back to the question of like, you know, when you pick native plants, possums, bees and birds, what what is their voice. So increasing helping people to understand the issue that they faced, for example, in an increase if I was innate, if I was a possum, and then increasingly urbanized environment, my I am losing space. So hence, I have You know, I have problems finding shelter, my access to, to a food system which was natural is no longer natural. Yeah, you know, like then I am now increasing as possible increasingly reliant on food waste from let's say for example someone's bin on a public bin and or maybe as a possum to them because of the loss of habitat I am. I am increasingly finding it difficult to find a place where it's safe for me where increasingly urbanized environment I'm exposed to domestic animals that like for example dogs. Yeah, that might that might threaten my health and well being. I might be increasingly exposed to vehicles or roads because of the increasingly urbanized environment and so it can be in Germany are subject to a loss of life in the context of bees, I think You know, increase the idea of a nice environment might be a challenge, which I find would be the loss of floral gardens. And so, you know, the, or maybe the ability to build a to build a nest safely because people like you have all your paranoid people who go, oh my gosh, this, there is this beehive there needs to be removed, you know, it's not safe for my well being is not safe for my family's well being. And so can you think about the fact that the human beings are they are concerned about their own needs versus to the animals? And how do we balance out that conversation and design in outlining that the needs of the natural stakeholders and that that could be something which might be reading material for people before? I don't know. I'm trying to think about ways in which people can digest so and they can look at it in a simple way. How do they understand because I think we're all human and what somebody else is looking at the topic of bees like me cause I have an interest in bees as well. And so I went like, this is definitely and bird life is all like bird life what are some of the things that concern bird life are increasingly urban environments where birds no longer have trouble finding food. And so they're increasingly A good example is I live I live in an apartment building. I have these birds that come and sit in my balcony, because they've learned that people would feed them. Well, I've got friends who listened Moore Park gardens and so he feeds all these cockatoos. So they come in about four o'clock every day, he comes out your hands and seeds. And so part of is that that imbalance because he then think about people who are starting to domesticate, you know, wild birds and wild birds have suddenly started to think that you know, okay, that's a lots of ability to find food because of the urban environment. So the upkeep, I just need to turn at someone's balcony and they're going to feed me, right? Yeah, so yeah, so little Just do a thought like that.

Dan
And I do have question about maybe to tap into your marketing experiences like what do you think would be like sort of the main concerns or barriers people might have with emerging technologies in the realm of sustainability

Gabriel
Oh, okay. Definitely material impact in terms of impact that if you're designing materials, with around sustainability, are we are we using are we try to use materials that might be recyclable, or might have come from recyclable source or let's say for using wood comes from a sustainable source? If you are using if you let's say incorporate the idea of energy use, can we use renewable so for example, the idea of having a charging station for your mobile phone on the park bench? Can we use the solar cell to produce to generate energy We use battery to power something. So kind of like, how do you make it a bit more specific? Like, you know, how do you make it energy efficient? Now, from a material perspective, when it comes to sustainable source, end of life, when something when something no it can no longer be used, for example, your your bench or let's say, for example, something is designed can no longer be used? Can it be? How can it be disposed off in a environmentally safe way? When it comes to water? I think that's also an interesting thing. How much can you recycle? Because a lot of a lot of your design work, I think, when involves outdoor fittings and things, if there's an element of water involved, how recyclable is it? And then if you're talking about designing elements, which are used in public spaces, pollution, so in the context of environmental pollution, when you think about whether it might be a cause of that same water run those where people are, you know, let's say for example, you know, In here for a rainy day, and as there's a massive flow of rain that's sweeping down the road, and it picks up all these chemicals and runoff from let's say, for example, cars that are are parked and rubbish. And so it comes with impacts on impacts on the purity of water and how can we recycle? And then you think about if you're, if this water funnels back into an installation, does it endanger wildlife if they're drinking the water from it? And from a mining perspective, well, so think about how whether what you're building has been built with a very low carbon footprint. So for example, if you're building something, the carbon footprint for me is important because there's a market I think of sustainability from a carbon footprints mindset as well. When you think about materials you're using, does it have to be like say for example, this type of metal can we achieve the same results rather than having to cut a piece of metal we could use 3d printing and find a more more hardy piece of material instead. That's another angle, which I think about as well. Image carbonfoot print, water recycling and the energy and the end of life with any trauma variable is great. Yeah, yeah. And of life. Um, and I think also just looking at sustainability. Um, the, the ecosystem Where's being installed? What impact will it have on the ecosystem? So for example, if you're thinking of putting a bench in a place which currently does not have a bench, what's its immediate impact? We install it, you know, does that impact on a worm a significant part of the soil where there's there's a worm will be an active and healthy worm community and that you know, if you are ripping out and ripping A cement installation and installing something better is a more positive environmental outcome as well. So replacing in a context of urbanism, I think about if one of the things that Joel talked to me about is this whole idea of parking lots in there. Well, so that's great, because you're thinking, you're taking something, which is an environmental negative and turning to an environmental positive, so that designing in that context is good as well. Because then you're helping people think about sustainability as we are. We're recovering something which we thought we can no longer use anymore.

THU 28 - May - Martin Tomitsch.

Dan
It's recording now

Martin
So I was saying one of the initial thoughts I had was potentially issues around the light component and the effect of light on on the natural environment against Yeah. Okay there's some people that talk about how light might affect Nocturnal Animals I think you mentioned itself to acknowledge and it's always the devils that came up in the brainstorming I think some like them in the first exercises also people commenting on that. The I guess there's potentially I guess questions around maintenance. So you might have to consider with things like the nesting box for example, but also if there sounds like plans involve taking whether that needs someone like gardener or someone who regularly look after the plants and make sure to maintain and replace turb unnecessary. There's possibly a consideration around like the the context. So like this now sits on a white background but like what does it look like when you put it into into an urban environment like when you put it like on the street or and also what happens when you put it on a street in a particular suburb or like an in particular part of the city. There were some projects that I told you and I actually were both in the same session. It was nice

Dan
mushroom chair, the teraform one?

Martin
No, no, I put it on but more in terms of like a tree. There was It was kind of over the memory it was like in a roundtable with was at Edinboro University and someone had solar panels that look like a train or something. Like benches it looked like a tree with so and then I googled that and it's actually whole, is it there's a company out there that sells solar panels that look really luxurious, like we have a banner with the branches. But it's like an artificial tree. It's I actually don't like it necessarily because it's sort of like trying to copy a tree, but it's not quite a tree. But better, like no better that's like somebody has to look at and also again, with those with those examples. I was like that was the issue of how does it fit into the particular context where it explains in terms to light pollution. I've just come out of the biodesign student presentation, and they showed a project I haven't had time to look it up now. Because it came straight in here, but it's called glowy. And apparently they're using some bacteria to for illumination at night of shops maybe or something. So that could be worth having a look at as a concept. It sounds like it's a commercial product, possibly. But so like, uh, based on natural bacteria up with your um, yeah, also was gonna consider vandalism as well as in terms like the design of course.

Martin
And yeah, no, any I think it's like is do you want me to focus on anything specifically?

Dan
Um, no, I think we can move on to sort of where I'm sort of like, taking sort of the feedback in research from our workshops. So I had all our data and then you know, did a thematic analysis. Okay, put sort of like the key sort of areas that people like noted in vertical To learn material progress oversaw instruction, safety information waste management. And so a really quick sort of, so with the lighting of pollution, let's look into like red diesel red lighting, and lowered the lighting, as well as so it was more localized instead of like at a high vantage point where we Damn, you know, be like a straight line and just being the whole area. And so for the selection of red lighting was so wouldn't disturb the nocturnal non human cycles as much. So it does sort of like research into that from like the 50s. But it was more like a general research around nocturnal. So I still have to look into how specific I can get without being in consideration to awesomes. There's also an integration of like, sort of like A catchment area where you could also water the plants with a myriad of fish. So, you know, rubbish when getting there, but you still get watering barrier to try prevent children from climbing, those lessons, this idea about connecting networks, if you had multiple of these parklets, you could create sort of these new designs of bridges, especially across roads, if persons wanted to get across the road, they could use these sort of network bridges connecting across the road rather than using the road itself. Yeah, I thought the strength of parklets was sort of having them self contained. So they didn't really have to worry about tapping into main lines or power lines. They were just self contained. So I thought solar panels would have been a good sort of like a like way to interest this strength of parklets Yeah, so that was my current direction.

Martin
So are you integrating it in some way with the with cities, the parklet strategies of cities? Because that was a that's an ongoing, like a strategy that's quite topical or was quite topical over the past, I guess, five years or so. And I think I mean, some councils built parklets. Also in Sydney, like Waverly council pulled a few runs on the junction. That and I've actually, those are the only ones I know of really, but, like the other day, some way of linking up with that strategy, possibly the same concept. So I'm

Joel
Inner west in marrickville, there's some parklet marrickville road there Am I just am I just making that up?

Martin
No, possible. Yeah. Where like on or, yeah. I mean, there it has been there for a while, but don't know up Oh, yeah, maybe, maybe not. Some sort of like new seating area ready to add some Park car parking seating maybe?

Martin
No, possible. Yeah. Where like on or, yeah. I mean, there it has been there for a while, but don't know up Oh, yeah, maybe, maybe not. Some sort of like new seating area ready to add some Park car parking seating maybe?

Joel
Yeah, yeah, I thought there was like a reclaim of some space. Yeah. Anyway, sorry.

Dan
Um Cool, cool, cool, cool.

Martin
I mean, it's also I guess this is an interesting possibly if there's greenery in terms of air and heat. And it's especially more relevant for pets in Sydney. So like Parramatta for example where they have a lot of concrete and very high temperatures and summer. Yeah. Quite shading and also cooling down the space because the greenery Yeah.

Dan
Yeah. I didn't really have anything else for this session besides that.

Martin
Yeah. So the sort of you focus on this concept now rather than because you had two initially right? Yes.

Dan
Yeah, just trying to develop them. more refined concept from the new research data that from the workshops,

Dan
Yes. So I also cut out wireless charging because they use like electromagnetic induction to charge phone. So that was a big concern for one of our participants that raised yes burden us on Earth's magnetic field as a compass. So I guess they were sensitive to that. So I thought that was like a good reason to sort of have that feature out.

FRI 29 - May - Marius Hoggenmueller

Dan
Hey Hi, morning. Thank you for joining.

Marius
Can you hear me?

Dan
Yes. Great. Um, so this session is pretty much very open. It's more just to meet, you know, provide bit more feedback on the concepts that you didn't get a chance to. So it's more just like general critique session rather than a structured session.

Marius
Okay. Yeah.

Dan
Yeah. So I'll just share my screen. Yeah. Yep. So it's around this concept. If you if you have any questions or general critiques, you can just you know, sort of speak freely about this. Okay, um, I have to check your nesting box for possums, one of them birds.

Dan
So these are some pricing lights around this were like general critiques, but they were in the perspective of the assignment spot for now. I think it's, it's fine just to have like a general critique from Okay, all your perspective as a, as a designer.

Marius
Okay. I'm actually what I like about the maybe I started to think alike. I think you also thought another concept, right? Yeah. And what I like about this concept is that it's that it seems to be more integrated in a way. Like there's not this clear separation between humans and animals. So it seems to be more It seems to be more one one design compared to the other where you have this like, on roof, so I don't know I kind of I kind of like that. And it's also it's also a bit more playful I would say. Um, I mean, the question that I would have is like are what would possums really use? This kind of? Yeah, areas or would they still just hide from people around? Would they use this kind of kind of infrastructure to to climb there? How would look potential interaction between people who are sitting there and then there's a possum Climbing up your your back? Yeah. Are we are we? I don't know. Are we comfortable with this? Um

Dan
Yeah, that's a good point because the selection, like, native flora for, you know, an attractive food source for them. Because there's already sort of like, measures in place where people put up their own nesting box in the trees of their own backyards to sort Okay, yeah, keep possums outside of out of their roofs because sometimes you have a crack in the roof or some food would go into that rock. So putting in a nesting box in a tree sort of helped alleviate that. So this is more trying to put the nesting box away from backyards now,

Marius
yeah, yeah, yeah.

Dan
Um, But if there's not if you have nothing else to add maybe I could show you where maybe

Marius
one one other thing is I like the I kind of like the platform for like for if we are now talking a bit more again about like the user centered aspects I like this seating area but maybe it's the problem that I see maybe is that if people want to sit down together It looks a bit like they it's not really you know, open like it's not really engaging you you sit like on a like a bird on you know what I mean? Yeah,

Dan
it's, you're not you're not like facing each other. You're always facing outwards, or you're facing outwards. Yeah,

Marius
yeah. Yeah. So you're not you it's not it's not really designed to have like conversations or to, to have a social encounter of people necessary.

Marius
It's interesting I like few years ago, I saw a similar concept from an artist. And it was it looked it looked similar in terms of the design and not with the human modern human aspect. It was also like this kind of flower bench. And he also had the idea of of discharging wireless charging and his flowers they had like solar panels included in the in the in the flower structure. And the idea was to have like a self sustainable charge charging charging bench for for airports and things.

Dan
Yeah. So was that for indoor environment or outdoor?

Marius
No, I'll do our own. I can. I can have a quick look.

Dan
Yeah, if you have a link for that. I yeah, I'd look over it.

Marius
I'll send it to you later. I have to check. I'm not sure if they ever I know that she got Some, like some initial funding for to realize this project, but I'm not sure if they ever managed to get over the prototyping stage. I'm not sure if they found an investor or Yeah, I don't remember it quite a few years ago already. And yes, maybe with the I'm more talking about the user centered needs. It's, yeah, that's maybe because we are not really

Marius
yeah. Which is fine. And maybe the lighting component, it's just, it's just facing in one direction, right. So it's not it's not covering the whole area. Yeah. Maybe I mean with lighting the things as well, other sensors or that the light will will turn off or something like this because I mean, light pollution is another issue in it is. And I'm also not sure how, how possums would react to Yes. Lightning component. So that's maybe another thing. Yeah. But you wanted to say something.

Dan
Yeah, I was gonna maybe show you my current sort of very initial next iteration of this concept from.

Marius
Oh, yes, sure. Yeah. Yeah.

Dan
So So this is all my sort of started my thematic analysis. So I, I started so these are sort of like the key points people raised up. So material product lifecycle, interaction, safety information, waste management, just a quick sketch of what potentially look like so. Yeah, so you didn't raise them yet. Light pollution was like something that was a concern, like sort of like raised all the time. So thinking of using like red lighting instead of like your normal, white ambient light as that seems to be a bit more Suitable for nocturnal animals and isn't as disturbance. Yeah, and sort of using like, senses to activate for humans. So it wouldn't be on, you know, at 100% power capability yet most of the times it would only go to that threshold when there is a human present is reduced the service of natural light pollution because I, I, I think lighting is still very important at night for us at least so you don't run into it or have any obstacles when you're walking. Yeah, but one thing I did eliminate from this concept from like a technical technological teaching was on the wireless charges as someone raises that it might have been sort of like, area of concern for birds because wireless charges news like an alert electromagnetic induction so in spurts where you know, us like the earth's electromagnetic field as a compass, there would be more sensitive to that. So that that was like a good reason to cut that out.

Marius
Yeah, yeah. So you don't have charging stations. Yeah.

Dan
So that's, that's out now. Yeah, it's Yeah. It's just the sort of like the LED lights as a sort of smart feature to preserve power. Yeah. Yeah. So that's sort of where I've been at for this one. Yeah. And this solar panels to sort of like, I guess the key feature of parklets is like this sort of self contained. You wouldn't have to like negative to a mainline or pipelines have run. Oh, yeah. Be inactive. Yeah. Yeah. So that's sort of where I've been headed. If you have any more to add.

Marius
Um, yeah. I was also thinking if it's necessary, with the After charging with the charging related application maybe I mean another opportunity would be just to use like to have to have like a

Dan
distress call you speak like that connector ports or something. Yeah, yeah. I guess for an outdoor environments a bit more tricky with ports USB Yeah, yeah.

Marius
Yeah.

Dan
It is something to consider. Yeah.

Marius
I mean, what would be also interesting is to instead of building this infrastructure, from just from, you know, from materials or in an artificial way, would it be possible to have like a modular design which you could, which you could attach around trees. or something?

Dan
Yeah I guess the the weakness I thought of that was it you'd have to grow the tree or plant the tree in that space before you could do that.

Marius
But that's on the other hand maybe also a good thing right because it kind of hurts designers to or to the policies are made that more trees are planted or something.

Marius
So if you like I don't know if you if you think about Okay, for every new infrastructure project, you you have to plant a tree. Okay. Probably it will also restrict like, infrastructure project with which are obviously also important for creating open public spaces. So yeah, that's a bit of an Have an issue then.

Marius
What you mean by connective networks?

Dan
So if we had multiple sort of parklets creating like a sort of highway bridge for us to cross instead of crossing Ah, okay, creating a new desire line, like you're urging a new path for them to use. Yeah, yeah, that would only work we had like multiple setup. If it was sort of just one single one. It would just just be a normal tree branch. Yeah, yeah. Yeah.

Marius
And maybe what I was just thinking about the bench thing is, you know, the the benches and the In the in Sydney trains that you can flip the seats oh yeah maybe if you think about something like this that you that you have like maybe three or four benches in this in this round structure which kind of which kind of are connected, but you could easily you could easily switch them in which direction you are sitting. Maybe you maybe some people want to sit towards the towards the possum, right. Yeah. And then you also you would you could depending on if people know each other have people want to want to interact with each other. You could just flip the flip the benches and then either people are sitting towards the, towards the tree structure or they're sitting facing outside of the structure.

Dan
Yeah, that's that's quite nice like interaction. Point. Yeah.

Marius
And could be interesting too. And then you also get more diversity in terms of how you use the space maybe. Yeah.

Dan
Yeah, I think that's been great. I know you have to teach soon. So I'm sure we can wrap. So, yeah. Now, any final thoughts?

FRI 29 - May - Callum Parker

Dan
Hi, thanks for your time again

Callum
yeah no worries.

Dan
So this session is a bit more open and not very structured this time around. So it's more just a chance to give you the chance to like sort of, like give me a bit more feedback and critiques general critiques on the concepts I presented from last week. Sure. So we could I guess we could start with this concept. So you could ignore the post it notes these are just from the last session where people sort of gave critique from the perspective of the persona, but for now, it's just more a general critique from your perspective as a designer and on person.

Callum
So, you want me to comment on the design?

Dan
Yeah, just just general comments or concerns you you haveabout it.

Callum
Oh, I gotta think back to the last session. Yeah.

Dan
One of your ideas I liked was on using sort of branches to convey the sort of the healthiness of the environment, like the branches would go up and down to show the state of the environment, which I quite liked, I'm just figuring out how to sort of integrate that. So I don't have animals getting caught in gears or anything like that.

Callum
Yeah, I didn't think about that. But yeah, that's a good point.

Dan
That it was like a nice idea, because it's sort of like illuminated, sort of, like, on the use of sort of like a lightning component to display information using mechanical aesthetic.

Callum
I think there was one question The session I think, as you noticed, Marcus seems to be leading that quite a lot was about the balance between humans and, and the animals as well like, and that Yeah, something that might be good for humans like the idea of the moving branches, maybe it's not so good for maybe the possums that are taking precedence in there. And same for like, I think I, I one point, right an idea about lighting paths for people. But then, of course, I didn't think about maybe that would have a negative impact on on the animals that take residents around in that area. So there's, there's that very important discussion about kind of keeping that, that balance. I think the this as it is, without the idea of moving branches is, is a pretty good idea, because it gives shades to humans when they're sitting down assuming that The plants is actually a real cool one and it's climbing up. I think that would be really cool if if you could get it to survive and and climb up to the branches and then that might entice more animals like birds and possums to come. So I think it's a really neat idea. And you have that kind of it feels a little bit more natural and a little bit different to the concrete jungle that we're always seeing around in cities. I kind of like this idea a lot.

Dan
Yeah. Like the in Singapore the Bay of garden trees, like the super trees, sort of, like scale that down. So yeah, it's more about more like a installation rather than a site revamp. Um, so I guess thanks for that. I think I just want to sort of walk you through sort of far I've been heading so out of the Like discussions in workshop research data, sort of like grouped into like six key themes, so materials product lifecycle interaction, safety information waste management. So this is sort of like something as an initial iteration for the next step, like something we touched on was like the lion pollution. So I out of some study about the use of red LEDs and lighting as a way to sort of eat less disturbance as a lighting source for nocturnal animals, but that research was still quite a general area for nocturnal animals. So I still have to like, look into that in the area of contextual being possums. So instead of like having a street streetlight bit more localized and just to this area, rather than the whole street, Yeah, and one of your other ideas about sort of like a community area. So for like planting sort of vegetables or fruit for those I still like kept some of that it was more like people could empty their water bottles into like this water vessel where we could take advantage and have a water source for native plants instead. Working on someone else raised sort of like concerns about children and climb, so just thinking of sort of like a barrier so they wouldn't climb this tree. And so the wireless charging features I decided to cut because someone raised concern for the birds because I'm, I have some of my extra research around that They use electromagnetic induction to charge our devices. And since birds were using like the Earth's magnetic field as a competence, they'd be a lot more sensitive to that. So that was like a interesting sort of reason to cut that feature out and just keep live light. Because I still think light is very important at night for humans. Just to you know, you would avoid this obstacle at night and maybe LEDs would be red LEDs would be a good compromise for both stakeholders. Maybe you don't have to have the lights on all the time.

Callum
Maybe there Yeah, sort of sensor that comes on with a human Yes. Take the sit down on the on the

Dan
Yeah, I guess we'd have to like to think about like that sensitivity of the lighting sensor

Callum
could be like a pressure sensor on the seat maybe or something like

Dan
And sort of the idea with these connective network is if we, you know, sort of take advantage of multiple installation, we could sort of like create a highway bridge above roads as a, you know, creating a new design line. So possums could cross areas without using or crossing the road, they just use a highway bridge instead. Yeah, so that's sort of where I've been sort of thinking with the sort of added from.

Callum
That's really cool.

Callum
Yeah, I like the idea. So you're thinking of like some sort of vine or something to go across the road.

Dan
Yeah, just use something to help facilitate that if we, that sort of more, if we had, like, an opportunity to put, you know, one on each street corner or something. Yeah. By I guess, it could still work alone as a single installation. But that was something that a concern was raised about putting these new roads you know, you didn't something Another thing to consider about roadkill?

Callum
Yeah, it's, it's a tricky one.

Callum
But just thinking of how we can build on top of existing infrastructure or output some new stuff in mmm hmm I think maybe that's a good start just having some sort of cable because I know like possums already use like the telephone wires and whatnot.

Dan
Oh yeah, yeah, yeah. I think I was starting to read I think I'm beginning when I was presenting sort of like concepts to Joel I thought about designing like guards for power lines but that area was sort of like sort of like quite established anyway, so wasn't interesting. Rather trading like artificial trees for like reclaiming backspace.

Callum
Yeah, yeah. This is really cool. I like this idea. Yeah, what are their solar panels? Okay. Uh huh. Yeah. That's really cool.

Dan
Yeah, I guess the idea around that was like, the sort of strength around parklets was like, quite self contained. They didn't really have to tap into like a main line or pipeline.

Callum
Yeah, yeah, definitely. And for this sort of thing, it'd be a really good opportunity to to do that. I guess you could also I think that looks good. Just maybe the placement of the solar panels if they're underneath the branches, maybe.

Dan
Ah, yeah, yeah.

Callum
might not get the maximize amount of sun you might maybe on top of the possum box or something.

Dan
Yeah. placement. Cool.

Dan
But yeah, I think if there's nothing else to add or if you want to have any final thoughts before we wrap since I know you have a class I think to teach soon

Callum
yeah I do last one so then free um Yeah, no, I think this is come along quite well. I think the other one other thought I had was maybe if you depending on how much power you can get through the solar panels is there is a limit maybe there could be some option to I don't know heat the possum box or or heat the pole to promote the plant's growth.

Dan
Oh, okay. Yeah.

Callum
That's assuming you're in full sun and you're generating quite a lot of electricity. And I'm not sure if that can actually be implemented, but maybe it's an idea. Yeah. This is nice. I like the idea of like humans and animals co inhabiting space. It's It's really cool. I hope I can see this one day.

Dan
Yeah, I think they'll just be like a nicer picture by the end of my research. Yeah,

Callum
yeah. A bit more refined by you. Are you planning to submit this as like a paper anyway?

Dan
I'm not sure what Joe has planned for because I don't think we have any ethics approval. So right now it's like a student project where it's, I think Joel did want to do something with this, but not sure it's headed. Yeah. I don't really know if I want to do a PhD or not. But um, yeah, I'm still very open after my course. This master's program.

Callum
Yeah, I mean, even even if you don't end up doing a PhD papers that still can still catch attention even in industry. I know a friend who managed to get a job just because he had a paper. I was someone else so might be something worth looking at. But yeah, this is this is really cool. That's the reason I asked because I think this research is very novel. So I think there's definitely something in there that you guys could write up.

Dan
Cool. Um, yeah. Appreciate it. Thanks, Callum Yeah, no thanks for all the time. I think we can just wrap that.

Callum
Okay. All right.

Dan
Okay. Thank you so much again.

Callum
Yeah, no worries. Take care. Bye.

Questionaire

Question 1
What are the aspects of this concept that you like?

Responses
The climbing aspect, something I wouldn't have thought

Love the consideration to non-human stakeholders and the insistence on a natural cycle for the concepts.

I like the concept of expanding the urban ecosystem to be more inclusive of non-human elements

The design goal to genuinely care for more-than-humans in the urban environment.

I liked both concepts probably more the one that looks less like a tree for now as it is clearly a man-made structure and demonstrates a clear intention to incorporate non-human elements into it. So it makes a statement by doing that.

Question 2
What are the aspects of this concept that need improving?

Responses
I think the wireless charging seems out of place

Obstacles such as implementations and going against governing bodies may be significantly reduced by pre-emptive design decisions.

I think there needs to be more consideration made on the part of addressing the requirements of animals beyond their literal nutrition and housing requirements. More consultation with ecologists and environmental scientists about the logistics and needs of flora and fauna if they're to be included in these designs.

Attention to the realities of transferring design from the design space to implementation: institutioning

For the tree concept it could be improved if it was actually made from a tree or around a tree? The lighting would have to be reconsidered to not interfere with nocturnals

Question 3
What additional features would you like added to this current design concept?

Responses
Being able to water the tree, how do people climb for maintainence, cleaning.. dont know how possum poop smells..

Whilst others want to remove as much of the non-organic - i think a digital integration (whether automated or managed by locals) would be great to get some realtime info on the status of elements within the spaces.

A more general plan about how these elements would fit into a larger ecosystem that gives spaces for

I think the Miro board contains lots of suggestions to improve/add features to the 2 concepts.

Question 4
What are the types of potential scenario(s) where and when this concept might not work?

Responses
Possums reject the house, attacked by birds

Traditional or highly regulated municiplaties that are wrapped up in red tape regarding progressive change,

I believe the concept will not sustainably address the needs of natural wildlife without further research into accommodating ecological factors and will not have the desired integrations stated in the goals if implemented as is.

It would be useful to consider Lisa Nathan's value-based scenario design, ie. scenarios where user needs clash, e.g. possums having a wee whilst people waiting for the bus.

I think it would be good to consider more the context around the bench and how that can be integrated into the design better. Also would this bench operate in isolation or could it be a network of benches that provide respite and refuge to all across an urban environment. How would they be connected to one another physically and virtually?

Question 5
How does this current design concept address the needs of both human and non-human stakeholders?

Responses
i don't know much about the possums behaviours and habits etc but I guess human will like it, just have to test it and see.. depends how it is integrated into the environment

Seems to restore some harmony and balance between the 2 - drawing on eachother.

It addresses both parties needs to have a space, although it makes the assumption that both parties would use the space in a similar way.

At the moment it looks at human needs first (waiting for the bus wanting shelter) and then adds more-than-human needs as a secondary element (nesting box on top). What would it look like to turn this around? More-than-human needs first, human second?

Re BenchE: Humans find a place to sit and charge phone while insects find some food and possums a resting spot.

Question 6
Do you think this concept prioritises a stakeholder? If so, how can the design be adjusted to become an equitable co-existing space?

Responses
No

No so far its reasonably balanced.

It clearly prioritizes the human stakeholder. It makes concessions and acknowledgements for the other stakeholders, it also makes an assumption that there is a similar level of supporting infrastructure that would allow the bees and possums to exist in an urban environment in the first place.

It'll be useful to think about what it takes to bring about human sacrifice to comfort and convenience in order to establish a more equitable co-existing space.

More can be done for the birds. Also consider how to include a water source as animals get thirsty especially in Australian hot summer

Question 8
What are the potential concerns around human and non-human stakeholders co-sharing this proposed design concept?

Responses
rejection as in not being accepted by either stakeholder

Initial contact and uneducated individuals may find threat in the presence of fauna, and cause harm. they same may be said for the reverse.

There is an imbalance of power in both the relationship but also level of need addressed in these concepts. The humans are the only participants who have their needs met outside of these designs, and the animals are totally dependent on these structures for food and shelter. If one party needs this design in order to survive, and the other can choose whether or not to engage with it, how can both be equal stakeholders?

Plenty of feedback in the Miro board already.

Light & energy sources - are they a priority for human and not the animals?

Question 9
How can human and non-human stakeholders collaborate together to design smart urban street furniture that accommodates the needs of each stakeholders?

Responses
It is important that the concept is testing and introduced slowly. Like animal is introduced to their habitat. Both humans and non humans have to be 'educated'. Needs lot of testing before final deployment. Growing the plants etc seeing if possums like the shelters. Maybe in a small scale for longer periods of time

A trial and error process is no doubt required to see the changes and adapt.

As the animals are not able to participate at the same level as the human stakeholders, they must be represented by someone who understands their needs and can speak for their "interests".

Check out the summary of our PDC 2018 workshop on this topic here: https://eprints.qut.edu.au/128763/ and other more-than-human pubs in our shared paperpile library: https://paperpile.com/shared/mqoGoB

If only we could speak animals and plants...instead need to carefully include the right proxies to represent the needs of the voiceless and include the bad guys as well because ultimately the people at the top need to be brought down into the discussion somehow - so who are the ones that can speak to the top and the bottom? strengthen ties with the people in the middle :)

Persona Critique

Emma (Inner City Dweller)

Adrian (The proud homeowner)

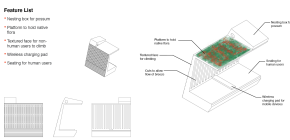
Florence (Native Flora)

Beans (Possum)

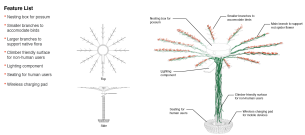
Buzzy (Bee)

Loraine (Lorikeet)

Concept BenchE



Concept TreeE



Thu 21

Fri 22