

Media Architecture: Facilitating the Co-creation of Place

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To the angels who are playing in the skies above us...

Supervisors

Principle Supervisor: Dr Mirko Guaralda

Dr Mirko Guaralda is senior lecturer in Architecture and currently is the Post-Graduate Coordinator for Architecture and Creative Industries Faculty (CIF) Research Ethics Advisor. Mirko's background includes experience in architectural design, landscape architecture and urban design; his research focuses on People-Place interaction. Mirko's work analyses cityscapes through the identification of recurrent patterns, building typologies and design principles. The identity and character of a site are interpreted analysing also lived experiences and uses of the build environment. Mirko's research aims to provide a better understanding of urban dynamics, at different scales, to support a positive development and/or management of our cities.

Associate Supervisor: Professor Marcus Foth

As the founder and director of the Urban Informatics Research Lab, Professor Marcus Foth has extensive knowledge and expertise in the field of human-computer interaction design. Foth's research explores the intersection of people, place and technology informing urban design.

Associate Supervisor: Dr Jennifer Seevinck

Jennifer Seevinck is an electronic artist, researcher and lecturer in Interactive and Visual Design. She has worked as an artist, freelance designer, researcher and educator since 1993. Her practical and research interests include interaction design and visualisation; specifically interactive and concrete art, emergence, tangible computing, virtual reality and medical simulation.

Abstract

Typically media and architecture have been brought together by private entities and property owners for the purpose of advertisement and entertainment to attract the attention of people. The development and accessibility of interactive screens allow for media architecture to not only display content but for users to engage with it.

The purpose of this research is to investigate the emerging discipline of media architecture, to question how this hybrid architectural approach can, not only encourage community participation and engagement but to seek how it facilitates the experience of place. The ability for media architecture to become increasingly open and accessible for the purpose of helping people appropriate place or create communities for and by themselves is explored within this thesis through three distinct design interventions. The different design interventions were created and implemented in South East Queensland between 2012-2015.

This thesis employs a research through design methodology to explore the question of how media architecture can facilitate the co-creation of place. Architectural design methods and theories are combined through the design interventions with interactive media and urban informatics to provoke urban opportunities for the social interaction, adaptation, and appropriation of media architecture. To seek deeper understanding of the motivation for participation and engagement the “Do-it-Yourself” (DIY) and “Do-it-with-Others” (DIWO) phenomena is reviewed in the contexts of DIY technologies, DIY place making, and DIY citizenship to propose the notion of DIY/DIWO media architecture. The InstaBooth project which is the third and major design intervention, was designed, implemented and assessed to examine the DIY/DIWO media architecture concept.

The findings indicate that combining digital and tangible media with architecture can provide greater opportunities for the co-creation of place within urban environments. Applying a DIY/DIWO approach to media architecture has been found to have benefits in supporting community engagement from diverse parts of society however challenges such as access to property or public space, technical knowledge, safety or curatorial control do exist and need to be acknowledged. When questioning the impact of such an approach thematic analysis of interview data reveals that the InstaBooth helped participants to reach a better understanding

of their local community by interacting and playing with the InstaBooth, ultimately learning about themselves and each other through the process.

To explore how such design interventions make a difference in cities which are constantly evolving, the theory of urban acupuncture is utilised to conclude that it is not just one intervention that will make change. It is the overall effect of multiple interventions occurring across the city at different times and in different locations that will continue to make an impact in how people engage with the city they live in and assist in achieving citizen control. Media architecture can play a role in providing a voice for people and in so doing, improve their experience of place through co-creation.

Keywords

Co-Design

Community Engagement

DIY/DIWO Media Architecture

InstaBooth

Media Architecture

Participatory Design

Research through Design

Sense of Place

Urban Acupuncture

Urban Informatics

Glossary of Terms

This glossary is to indicate how the following key terms are used within this thesis.

Co-Creation - “refer(s) to any act of collective creativity, i.e. creativity that is shared by two or more people. Co-creation is a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual, as can be seen by the output of search engines.” (Sanders & Stappers, 2008 pg. 6).

Co-Design - “indicate(s) collective creativity as it is applied across the whole span of a design process...Thus, co-design is a specific instance of co-creation. Co-design refers, for some people, to the collective creativity of collaborating designers. We use co-design in a broader sense to refer to the creativity of designers and people not trained in design working together in the design development process.” (Sanders & Stappers, 2008 pg. 6).

Community Engagement - is undertaken by Local Government Authorities (LGAs) around the world to obtain public feedback on the development of infrastructure within the built environment. Through collaboration with communities, businesses and government organisations (Foth & Adkins, 2006), community engagement should guide urban planning decisions based on the outcomes of the engagement undertaken (Fredericks et al., 2015).

Design Intervention - refers to the different experiments within this thesis that employ a certain level of design thinking or creative elements of design to intervene with people and/or a public space to inform change by inspiring people to share their ideas, learn from one another and see their community in a different way - see pg. 28-29.

DIY/DIWO Media Architecture - a type of media architecture that allows for more laypeople to be a part of the creative process of media architecture initiatives in order to promote community engagement and foster genuine citizen empowerment (Caldwell & Foth, 2014).

Human Computer Interaction - “the field off Human Computer Interaction (HCI) came into being over 25 years ago with the mission of understanding the relationship between humans and computers, often with an eye toward improving the technology's design" (Sellen et al., 2009, pg. 58).

Media Architecture - “Media Architecture is an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities.” (Brynskov et al. 2013, p. 1-2)

Participatory Design - refers to the emerging practice of design that incorporates the involvement of “different non-designers in various co-design activities throughout the design process. By non-designers we refer to potential users, other external stakeholders and/or people on the development team who are from disciplines other than design such as those in marketing, engineering, sales, etc. PD processes usually involve many people having different backgrounds, experiences, interests, and roles within the project.” (Sanders et al. 2010, pg. 1).

Sense of Place - refers to the sensory experiences with an environment which foster the creation of memories and meanings, and shift a space to a place (Carmona et al., 2010; Tuan, 1977).

Urban Acupuncture - “a simple, focused intervention can create new energy, demonstrating the possibilities of a space in a way that motivates others to engage with their community. It can even contribute to the planning process. This gets to the essence of true urban acupuncture-it needs to be precise and quick, that’s the secret” (Lerner, 2014, p.4).

Urban Informatics - “is the study, design, and practice of urban experiences across different urban contexts that are created by new opportunities of real-time, ubiquitous technology and the augmentation that mediates the physical and digital layers of people networks and urban infrastructures.” (Foth et al., 2011).

Wicked Problems - “Wicked problems...include nearly all public policy issues...The search for scientific bases for confronting problems of social policy is bound to fail because of the nature of these problems...Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the indisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct

or false; and it makes no sense to talk about 'optimal solutions' to these problems... Even worse, there are no solutions in the sense of definitive answers...." (Rittel and Webber, 1973).

List of Publications in this Thesis

1. Caldwell, Glenda Amayo (2013) **Hybrid place: blurring the edge between the digital and physical layers of urban environments.** In Sanders, Paul S., Guaralda, Mirko, & Carroli, Linda (Eds.) *Urban Form at the Edge: Proceedings from ISUF 2013*, Queensland University of Technology (QUT) Creative Industries Faculty – School of Design in conjunction with International Seminar on Urban Form, Brisbane, Australia, pp. 137-145.
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3. Caldwell, Glenda, Bilandzic, Mark, & Foth, Marcus (2012) **Towards visualising people’s ecology of hybrid personal learning environments.** In Brynskov, Martin (Ed.) *Proceedings of the Media Architecture Biennale 2012*, Association for Computing Machinery (ACM), Aarhus, Denmark, pp. 13-22.
4. Parra Agudelo, Leonardo, Caldwell, Glenda A., & Schroeter, Ronald (2013) **Write vs. type : tangible and situated media for situated engagement.** In Sugiyama, Kazuo (Ed.) *Consilience and Innovation in Design Proceedings and Program, IASDR*, Shibaura Institute of Technology, Tokyo, Japan, pp. 4818-4829.
5. Johnstone, Sarah, Caldwell, Glenda Amayo, & Rittenbruch, Markus (2015) **Defining the InstaBooth: Facilitating debate and content creation from situated users.** In *MediaCity 5*, 1-3 May 2015, Plymouth, UK.
6. Caldwell, Glenda Amayo , Guaralda, Mirko , Donovan, Jared , & Rittenbruch, Markus (2016) **The InstaBooth: Making common ground for media architectural design.** In *Media Architecture Biennale 2016* , 1-4 June 2016, The Concourse , Sydney, N.S.W.

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Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Glenda Amayo Caldwell

Signature :

 QUT Verified Signature

Date: 9 November 2016

Acknowledgements

Fischer et al. (2005) points out that both scientific and artistic innovation arises from “*joint thinking, passionate conversation and shared struggles*” (p.483). Collaboration involving what Fischer et al. point out has been an intrinsic element of this PhD journey, there has been plenty of joint thinking, passionate conversations on brainstorming the next iteration, and of course many shared struggles with maybe some tears, but plenty of laughter as well. The collaboration has gone beyond the supervisor and researcher team to include fellow HDR students, peer academics, international academics, industry partners, community representatives and most critical the contributions of the people of Brisbane and Pomona, Queensland. I have been incredibly fortunate to have had the opportunity to work with a wealth of talented, intelligent, passionate, and inspiring people all along the way and am very grateful for having had this opportunity. All of their contributions have made significant impact on this research and therefore due to the nature of co-creation I have to highlight that very little of the work presented here was done in isolation. I have relied on the contributions and collaboration of many, many of which have co-authored the papers that have been written during this PhD. **Thank you to all of them.**

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Chapter 1: Introduction

Ubiquitous computing, mobile devices, and the web 2.0 have become a part of our daily lives including the ways in which we work, play and learn (Kolbitsch & Maurer, 2006; Foth et al., 2011; Caldwell, 2013). The world in which we live in is composed of a constant flutter between the physical and digital spaces we experience with our multiple senses, which today are mediated or augmented through technology (Foth et al., 2011). Typically sensory experiences with an environment foster the creation of memories and meanings, which in return support the development of a sense of place (Carmona et al., 2010; Tuan, 1977); today this process is heavily influenced by digital media. Manzo and Perkins (2006) have also identified how people's personal connection to places nurtures stronger communities.

The extent of impact that connections to technology and media has on the way people experience their surroundings is of great personal concern. This research is particularly valuable at a time when screens (of all sizes) provide readily available access to information and entertainment at any time nearly anywhere (Verhoeff, 2012a; Foth et al., 2008), however many people from various social and cultural backgrounds, still feel disconnected from their communities or far removed from political entities and policy makers. Ironically we are at a time where communication channels are at their most prolific and the options to voice ideas through various social media outlets, blogs, forums, etc. are at our fingertips yet many people typically still feel as though their opinions do not matter, that nobody is listening to their concerns, and disempowered to make change.

The purpose of this research is to investigate the emerging discipline of media architecture, the architectural design of spaces that combine digital media with the physical presence of buildings (Brynskov et al., 2013), to question how this hybrid architectural approach can not only encourage community participation and engagement but to seek how it facilitates the creation of place. The potential to use media and technology as a way for more people to have a say or contribute to the experience of a place through architecture is worth pursuing and can assist to create stronger communities. This research on the ability for media architecture to foster place is significant because it demonstrates the power of collaboration and communication across disciplines and community members. The findings reveal how the combination of digital and tangible media within an architectural space promote creativity,

expression, and the sharing of knowledge amongst co-located users. Media architecture can assist to provide a voice for more people across society and enforce the role that architecture and design can play in community engagement. As a result of the research in this thesis an alternative definition is proposed in the final chapter to emphasize the collaborative nature of media architecture which brings together the interests of different disciplines and actors. The definition also shifts the focus to the benefit of the end user as to why media and architecture should be brought together and for what purpose.

Research Context

For centuries media has been embedded onto architectural surfaces and facades to communicate religious stories or information to citizens (Fortin, 2016; Caspary, 2009; Venturi & Brown, 2004). The stained glass windows of Gothic cathedrals exemplifies the combination of materials and lighting to illuminate Biblical stories to people who were not able to read or write (Caspary, 2009; Venturi & Brown, 2004). Other examples include Egyptian hieroglyphics, and Renaissance murals and symbols (Caspary, 2009; Venturi & Brown, 2004). This combination of media and architecture exemplifies the typical use of buildings to portray information that historically has been controlled by people at the top of the hierarchy. The ability for laypeople to create the information or messages on buildings has been minimal and mainly conducted in illegal forms such as through the use of graffiti (Rowe & Hutton, 2012; Dovey et al., 2012). However opportunities exist where combining digital technologies and media (urban screens, projection mapping, mobile devices, social media, etc.) with architecture can provide the ability for more people to interact with or create their own content for media architecture.

Ubiquitous technology impacts society's understanding and experience of cities causing the role of architects in the design and development of contemporary urban environments to evolve. This highlights the need for architects to embrace technology not only as a tool to design and draw with but as way to communicate with and gain understanding of the city users (Caldwell & Guaralda, 2016). Architects have the ability to combine different types of media at an architectural scale. The capacity of media architecture to shift from one-way flow of information has been limited until recently, when the technology for digital facades and

screens has become more interactive (Kronhagel, 2010). These technological developments provide the ability for information to flow in two directions, in and out, allowing people to interact and respond with the information they see. This also can allow for architecture to become more playful encouraging people to engage with it.

Currently property developers control many aspects of construction, Sam Jacobs (2014) states that the role of architects in contemporary society is diminishing compared to the time between World War II and 1980's. During that time architecture was a central part of the construction of society by conceiving the vision of what society could do and could be. He urges architects to look forward to find new ways to regain significance within society that goes beyond the design and production of building facades (Jacobs, 2014). In response to Jacobs' call, this research explores the potential for a combination of media types to be used in urban spaces to influence the construction and characteristics of physical spaces to enhance 'sense of place', ownership and identity with urban environments. In this way it expands the conception of media architecture where information is merely presented on building surfaces to a new concept of mediated urban space. *"Perhaps architecture should step back from the act of building as its ultimate fulfillment in order to provide a deeper, more significant vision of how we are going to live, work and play and how places can become economically and socially meaningful and sustainable in the long term for the people who live in them,"* says Jacobs (2014). It is in this vein that this research explores extending the ability of architecture to surpass the creation of physical spaces to examine its capacity to facilitate communication and understanding of communities.

John Tolva, the Chief Technology Officer for the City of Chicago in 2013, believed it is the responsibility of urban designers, for the integration of the digital layers of the city with the physical by embedding technology into the urban environment (Stott, 2013) where media architecture is one way to do so. This study builds on Tolva's claim that there is a need for a new discipline that is forward thinking, merging urban design, urban planning with urban informatics to create networked public spaces. To stay current and ensure their future, architects need to acknowledge technology and information as more than just tools but as materials so that the experience of the city will be improved (Caldwell & Guaralda, 2016) and as Tolva says, *"Done smartly, design for a networked urbanism will make the city better*

along axes that already exist: convenience, safety, sustainability, and of course as a social network,” (Stott, 2013).

Research Problem

Due to the increasing access to mobile technology, Kurt Iveson indicates that the ability of mobile media technologies to inform urban governance is being explored across the globe *“Many of these experiments involve establishing new channels of information from urban authorities to urban inhabitants, in the hope that city life can be made better by providing people with useful information where and when they need it...experiments are also underway which seek to enhance the flow of information in the other direction, from urban inhabitants to urban authorities, ”* (2010, pg. 115). Similarly an opportunity exists for media architecture to explore not only how information is displayed to the public but how can media architecture support the communication from the public to the decision makers (Caldwell & Guaralda, 2016).

Community consultation and engagement is typically a challenging task for urban planners, designers, architects, and policy makers (Burgess et al., 2006; Foth et al., 2013; Caldwell et al., 2013). Collecting local perspectives to inform policy, planning, and design is a critical aspect of urban development however existing practices are seen to represent a limited part of society (Innes & Booher, 2004). The ubiquitous nature of mobile media, social media, and urban informatics have been found to provide opportunities for more parts of local societies to engage in community consultation processes (Fredericks & Foth, 2013; Houghton et al., 2014; Caldwell et al., 2013). Urban environments are embedded with complex construction, information, transportation, communication and social networks which can be communicated through digital or tangible information streams revealing the digital and physical layers of cities through urban informatics (Foth, 2009; Foth et al., 2011). The combination of media and architecture provides the ability for urban informatics content to be revealed to citizens at an architectural scale however an opportunity exists for city users to interact and engage with such data and information in more meaningful ways.

This research addresses two problems:

1. The discipline of media architecture is currently contested and misunderstood. It is evolving and requires further research and definition to better understand its potential in order to progress towards a more meaningful combination of media and architecture.
2. Typical community engagement and consultation processes only reach a limited portion of society.

The aim of this study is to explore the ability of media architecture to become increasingly open and accessible for the purpose of helping people appropriate place or create communities for and by themselves through community engagement opportunities. By examining place theories, the “Do-it-Yourself” DIY and the “Do-it-with-Others” DIWO phenomena (Mota, 2011; Gauntlet, 2011; Paulos, 2012; Paulos, 2013) that has informed bottom up movements ranging from home improvement, urban planning, digital fabrication, place-making we propose DIY/DIWO media architecture (Caldwell & Foth, 2014). The purpose of suggesting this type of media architecture is to allow for the discipline to consider the needs and contributions of any person regardless of their discipline, knowledge, or background and to promote the sharing of knowledge. The co-design process of designing and implementing a “Do-it-Yourself” DIY/ “Do-it-with-Others” DIWO media architecture (Caldwell & Foth, 2014) prototype, and understanding its meaning to a community and impact on place are the key contributions of this research to the media architecture discipline. The outcome of this research intends to provide an alternative perspective on the evolving definition of media architecture. This PhD study argues that architects, interaction designers, urban informatics, urban planners, researchers, and local citizens all have a role to play in creating meaningful places that reflect the importance of physical spaces while acknowledging the digital layers that surround us. This research largely examines how community engagement can continue to be enhanced or supported through urban informatics and media architecture.

The disciplines and areas of study that revolve around the creation of urban environments is incredibly complex and multi-faceted, this study is just one step towards the co-creation of place through targeted design interventions that lead to a media architecture to be appropriated by communities in Brisbane and South East Queensland. The oxford dictionary defines an *intervention* to be “*the action or process of intervening (to be situated between*

things) ”¹. In HCI, design and urban research (Foth et al., 2008; Fischer et al., 2013; Moere & Wouters, 2012; Bilandzic, 2013), interventions are commonly referred to as experiments located within public spaces. I refer to the different experiments within this thesis as *design interventions*, each one employs a certain level of design thinking or creative elements of design to intervene with people and/or a public space. Although the design interventions are small in scale and reach, they inform change by inspiring people to share their ideas, learn from one another and see their community in a different way. By connecting these design interventions to the notion of urban acupuncture, a simple intervention that demonstrates the opportunities within a space and inspires people to engage with their community (Lerner, 2014), provides an ability to see how greater impact can be achieved across a city at different times and places.

Research Questions

The overarching question guiding this PhD study is:

RQ0: How can media architecture facilitate the co-creation of place?

This question examines the opportunities that media architecture can provide to local communities in establishing a meaningful connection with urban spaces. To respond to this question, three sub-questions have also been identified:

RQ1: How can a DIY/DIWO media architecture be designed?

RQ2: How can a DIY/DIWO media architecture approach be implemented?

RQ3: How does media architecture impact on place?

Research Approach

The study employs a research through design approach (Zimmerman et al., 2007; Zimmerman et al., 2010; Gaver, 2012; Bardzell et al., 2016) where three design interventions were conducted in different urban spaces. The design interventions each involved an iterative

¹ <http://www.oxforddictionaries.com/definition/english/intervention> accessed 13 July 2016

cycle of brainstorming, designing, testing, and analysing ideas to address what Rittel and Weber (1973) refer to as wicked problems. The design interventions have informed the development of the following ones and the findings do not lead to black and white answers. The design interventions have each been a way to question broadly how different types of media and architecture can be brought together and how it is affecting the experience of place.

In order to address the research question and organise the thesis in a coherent manner the diagram in Figure 1. depicts the overarching research question with three subquestions. The subquestions address three broad topics of design and technology, people, and place which will be explored in more detail.

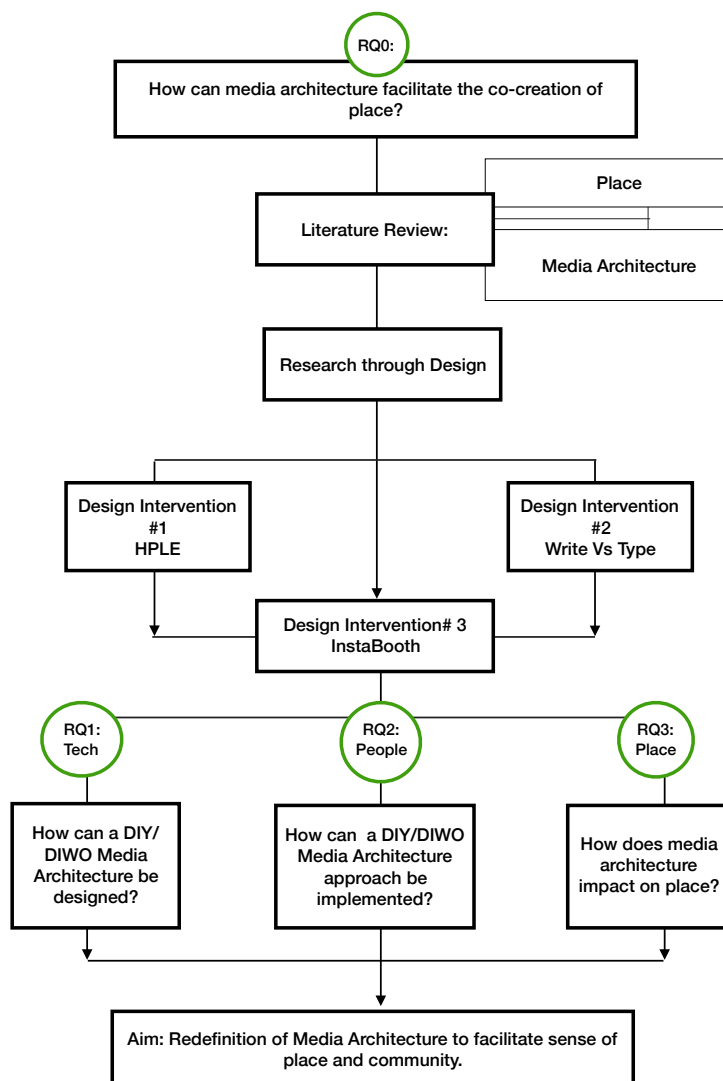


Figure 1. Diagram of the Research Questions

This process in addition to the ongoing literature review helped to address three aims of the study; understand the use of existing media architecture, design and deploy design interventions in urban spaces, inform the redefinition of media architecture.

Thesis Structure

This thesis is presented by published papers in accordance with QUT's regulations for PhD by publications. It is different to a traditional monograph in that it is divided into nine conference papers, journal publications, and book chapters (Figure 2.) which have been published or submitted for review during the course of this PhD candidature. Each paper has its own subsections of literature review, methodology, findings, discussion, and conclusions. It must be noted that some aspects of the literature and context are repeated in the different papers. The papers are closely related where many of them cite each other and address different aspects of the research questions and aims.

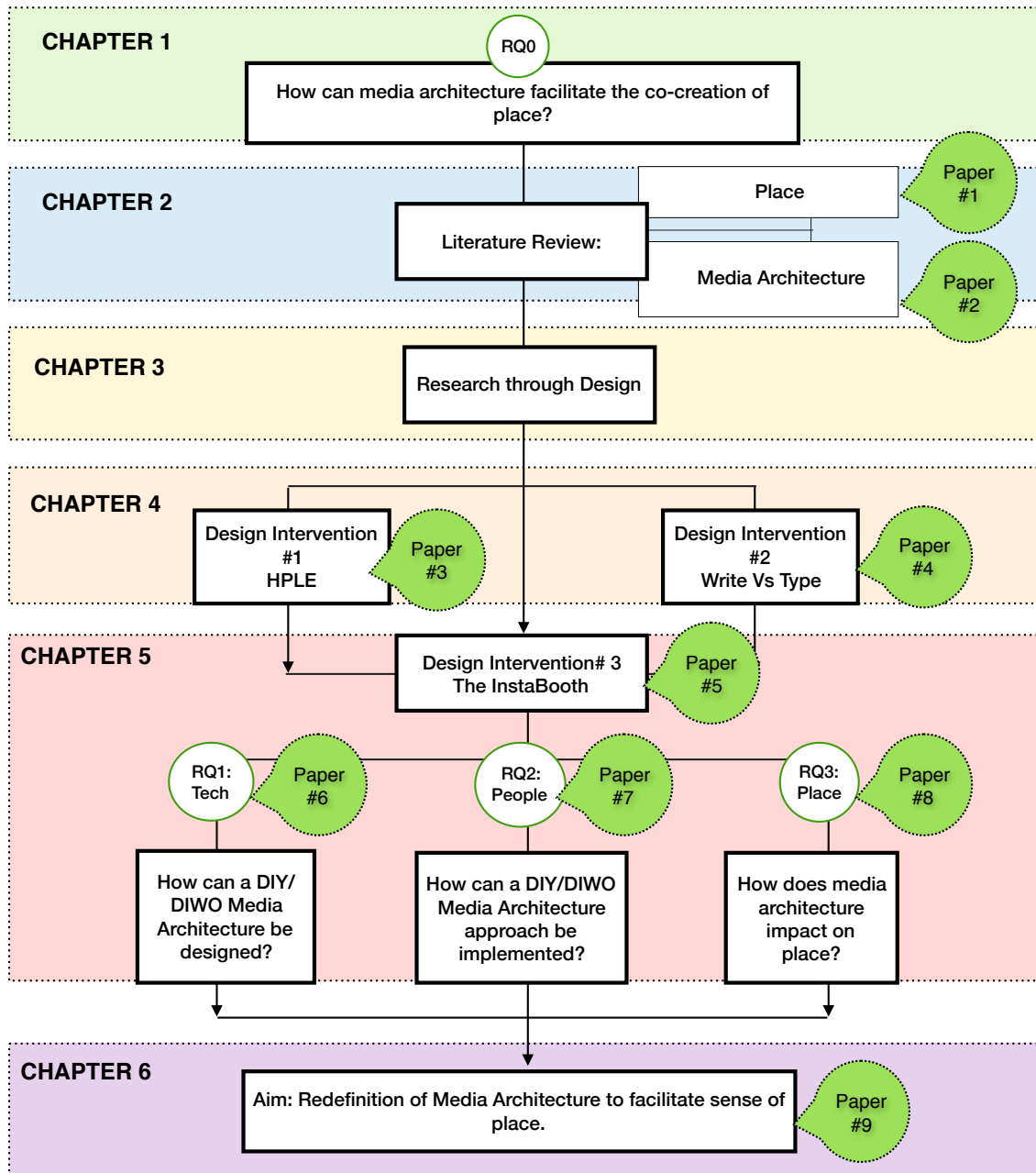


Figure 2. Diagram of Chapters and Papers within the Thesis

Chapter 2: Literature Review

The literature review chapter is composed of two conference publications. Each publication reviews a different facet of the research topic including place theory and media architecture. As a result of the comprehensive review of the literature and existing case studies, in each

publication a new angle on the topics are proposed such as hybrid place and DIY/DIWO media architecture.

Published papers in Chapter 2:

1. Caldwell, Glenda Amayo (2013) Hybrid place : blurring the edge between the digital and physical layers of urban environments. In Sanders, Paul S., Guaralda, Mirko, & Carroli, Linda (Eds.) *Urban Form at the Edge : Proceedings from ISUF 2013*, Queensland University of Technology (QUT) Creative Industries Faculty – School of Design in conjunction with International Seminar on Urban Form, Brisbane, Australia, pp. 137-145.
2. Caldwell, Glenda Amayo & Foth, Marcus (2014) DIY media architecture: Open and participatory approaches to community engagement. In Dalsgaard, Peter & Fatah gen Schieck, Ava (Eds.) *Proceedings of the 2014 Media Architecture Biennale*, ACM, Aarhus, Denmark, pp. 1-10.

Chapter 3: Methodology

Chapter 3 provides a summary of the methodological approach and considerations undertaken throughout the research of this thesis. The different design interventions are discussed including the methods utilised to collect and analyse data.

Chapter 4: Design Interventions

Two conference papers are presented in chapter 4. Each paper was the result of a different design intervention involving different contexts and actors. The ability to implement these small design interventions, to collect and analyse data early within the PhD allowed for preliminary findings that informed the third design intervention which was the major study of the thesis.

Published papers in Chapter 4:

3. Caldwell, Glenda, Bilandzic, Mark, & Foth, Marcus (2012) Towards visualising people's ecology of hybrid personal learning environments. In Brynskov, Martin

(Ed.) *Proceedings of the Media Architecture Biennale 2012*, Association for Computing Machinery (ACM), Aarhus, Denmark, pp. 13-22.

4. Parra Agudelo, Leonardo, Caldwell, Glenda A., & Schroeter, Ronald (2013) Write vs. type : tangible and situated media for situated engagement. In Sugiyama, Kazuo (Ed.) *Consilience and Innovation in Design Proceedings and Program, IASDR*, Shibaura Institute of Technology, Tokyo, Japan, pp. 4818-4829.

Chapter 5: The InstaBooth

Chapter five introduces the third design intervention, the InstaBooth. The first paper in this chapter describes the InstaBooth concept and positions it within a broader taxonomy of similar design interventions that have been tested across the globe. Learning from the case studies a series of recommendations were established which informed the design and development of the InstaBooth. The second paper specifically addresses research question 1 and provides a critical overview of the design process and technological aspects of the InstaBooth as a prototype of DIY/DIWO media architecture.

Published papers in Chapter 5:

5. Johnstone, Sarah, Caldwell, Glenda Amayo, & Rittenbruch, Markus (2015) Defining the InstaBooth: Facilitating debate and content creation from situated users. In *MediaCity 5*, 1-3 May 2015, Plymouth, UK.

6. Caldwell, Glenda Amayo , Guaralda, Mirko , Donovan, Jared , & Rittenbruch, Markus (2016) The InstaBooth: Making common ground for media architectural design. In *Media Architecture Biennale 2016* , 1-4 June 2016, The Concourse , Sydney, N.S.W.

The findings from the deployment of the third design intervention, the InstaBooth are discussed in relation to research questions 2 and 3. The implementation of the InstaBooth and how it is a prototype of DIY/DIWO media architecture is discussed in paper 7. Interview data is examined in paper 8 to examine how the InstaBooth impacted on sense of place.

Published & under review papers in Chapter 5:

7. Caldwell, Glenda Amayo & Foth, Marcus (2016). DIY/DIWO media architecture: The InstaBooth. In Wiethoff, Alexander & Hussmann, Heinrich (Eds.) *Media Architecture : Using Information and Media as Construction Material*. DeGruyter. (In Press)

8. Caldwell, Glenda (2016). Enabling Creative Citizens to Co-create Place through Media and Architecture: The InstaBooth. *City & Community Journal* (Under Review).

Chapter 6: Conclusion

The final chapter provides the overall discussion that unites all the articles and discusses the research findings in relation to broader urban and city making movements.

Paper under review in Chapter 6:

9. Fredericks, Joel, Caldwell, Glenda, Foth, Marcus, Tomitsch, Martin (2016) The City as Perpetual Beta: Fostering Systemic Urban Acupuncture. In De Waal, Martijn & de Lange, Michiel (Eds.) *Hackable Cities: From Subversive City Making to Systemic Change*. Springer (TBC). (Under Review).

Chapter 2: Literature Review

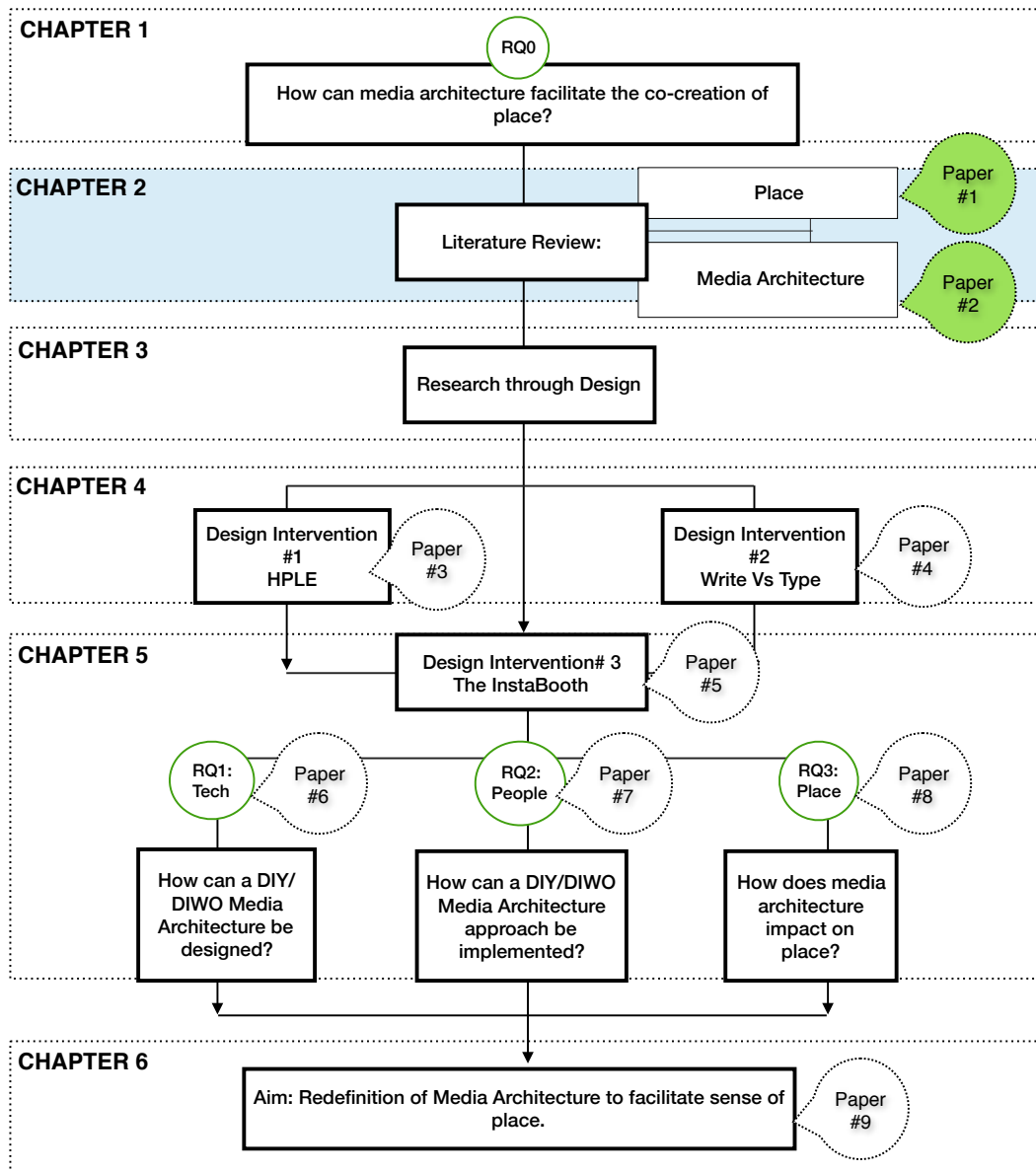


Figure 3. Way-finding Diagram of Chapters

The literature review chapter positions my study within the areas of place and media architecture as indicated in the diagram above, Figure 3. This thesis is composed of 9 different papers each including its own literature review that is specific to that paper and included in the different chapters. Therefore this literature review chapter provides the grounding for the thesis as a whole.

To address the overarching research question, *How can media architecture facilitate the co-creation of place?* It is critical to understand the importance of place and how that

differentiates from space. Considering the use of technology in different spaces and what that means to the creation of sense of place is also a main area that is reviewed in the literature and included in paper #1, section 2.1.

In paper #2, section 2.2, the current practice of media architecture is evaluated to review the ways in which digital media and architecture have been combined and for what purposes. This paper employs an existing scale of interactivity to assess the different cases that are reviewed finding that the scale can be extended to include performative and controllable interactivity. Paper #2 proposes a shift in focus of media architecture to be used for entertainment or aesthetics towards community engagement and community empowerment. The paper highlights that a gap in knowledge exists in the potential empowerment of communities through what we propose as, DIY/DIWO media architecture.

2.1 Hybrid Place: Blurring the Edge Between the Digital and Physical Layers of Urban Environments

Preamble

The paper included in this section was written early on in this PhD study and was an opportunity to gather initial thoughts around how the experience of place is affected by technology and the digital layers that surround us. At the time of writing this the focus of the PhD was on examining how tangible artefacts could be fabricated to capture the experience of place that occurs within a physical location and a digital space simultaneously. The idea was that digital fabrication technology and processes would be central to this PhD research. Although digital fabrication methods have been used to create parts of the design interventions, the focus of the thesis turned towards the social aspects and meaning of place rather than the use of digital fabrication technologies. The DIY or bottom up aspects of the maker movement inspired by growing interest and the sharing of knowledge around digital fabrication technologies remained of value to this research and assisted in informing the DIY/DIWO media architecture concepts which emerge in the following paper (section 2.2) and remain a focus of design intervention #3 discussed in chapter 5.

This paper was double blind peer reviewed and presented at the International Seminar on Urban Form (ISUF) conference at QUT in 2013. The opportunity to present this paper to an audience of predominantly architectural and urban design academics was encouraging to see that they could appreciate a novel take on the concept of place.

The outcome of this first paper provided a new perspective of place theory for me that extended beyond the architectural and geographic discourse to the lenses provided from computer science and interaction design. Literature and case studies are reviewed in the paper to support the notion of hybrid place through which awareness of the emerging discipline of media architecture arose. Through this process media architecture, with its capability to combine both digital media with physical space, symbolises the physical manifestation of hybrid place. The ability to examine the literature and the case studies in depth allowed the

identification of the approaches that needed to be explored and tested further through the design interventions which eventuated.

The concepts from this first publication which have informed the development of the research and have been carried through the thesis are:

- pg. 39 media space and architecture
- pg. 43 empowerment through content creation, sharing of knowledge and bottom up approaches
- pg 43 definition of hybrid place
- pg. 46 concepts from Ars Futurelab; social brainstorming, social fabrication, creative catalyst,
- pg. 48 promote face to face interaction through creative collective experiences

From this early stage of the PhD the intention to create an installation that acted as a creative catalyst and explored the combination of the experience of digital and physical place simultaneously, hybrid place, was clear.

Caldwell, Glenda Amayo (2013) Hybrid place : blurring the edge between the digital and physical layers of urban environments. In Sanders, Paul S., Guaralda, Mirko, & Carroli, Linda (Eds.) *Urban Form at the Edge : Proceedings from ISUF 2013*, Queensland University of Technology (QUT) Creative Industries Faculty – School of Design in conjunction with International Seminar on Urban Form, Brisbane, Australia, pp. 137-145.

Abstract

The purpose of this paper is to investigate the edge condition between the digital layers and the physical layers of the city and how tangible expressions of the interrelationships between them to create and define new experiences of place, creating *hybrid place*. To date there has been discussion and investigation into understanding the importance of place, similarly into defining hybrid space. This paper explores principles of place and space to question how they can be applied into defining and proposing the notion of *hybrid place* in urban environments.

The integration of media spaces into architecture provide infrastructure for the development of hybrid place. The physical boundaries of urban spaces become blurred through the integration of media such as computer technologies connecting the physical environment with the digital. Literature and case studies that reflect the current trends of use of technology by people in space and place within urban environments are examined.

Keywords

Hybrid place; digital fabrication; creative catalyst

Architecture can be seen as a way to give form and pattern to the social life of a community (Sinclair & Stohr, 2006).

The purpose of this research is to investigate the connection between the digital layers and the physical layers of the city and how tangible expressions of the interrelationships between them creates and defines new experiences of place, creating *hybrid place*. To date there has been discussion and investigation into understanding the importance of place, similarly into defining hybrid space. This paper will examine these principles to question how they can be applied into defining and proposing the notion of *hybrid place* in urban environments.

The Problem

Place, space, and hybrid space have been defined and discussed from a range of perspectives however what has yet to be explored is the notion of hybrid place. Ubiquitous computing, mobile devices, the web 2.0 etc. have become a part of our daily lives including the ways in which we work, play and learn. The world in which we live in is composed of a constant flutter between the physical and digital spaces we experience with our multiple senses and it is the memories and meanings that we attach to these spaces that create place. It is understood that place can occur either in digital or physical environments, but why not in both simultaneously?

Key Principles of Hybrid Place

There are four main factors that inform this research falling under people, place, space, and technology. This literature review investigates the current trends within the use of technology by people in space and place. The use of technology weaves the different disciplines of architecture, urban design, media design, interaction design, and urban informatics together to create opportunities for social interaction to occur within the digital and physical layers of the urban environment.

Space and Place

Paul Dourish has written two key papers that provide the foundation for this literature review. Initially it is important to understand that space is three-dimensional and provides the structure or the area for objects to exist and for things to happen (Harrison & Dourish, 1996).

The “affordances of space” or the interactions and actions that are available through space are different from person to person. Space can exist both in physical and digital environments, together or separately.

It is out of lived experiences and through applied meaning that people as groups or as individuals change spaces into places (Carmona et al., 2010). Within the fields of urban design and architecture there is discussion about the creation and understanding of place (Jackson, 1994; Trancik, 1986; Arefi, 2004). When discussing place phenomenology is often drawn upon as it refers to the phenomena that influence the experience of the human consciousness and it is this human experience that creates the understanding of place (Carmona et al., 2010).

Harrison and Dourish (1996) recognise that people also establish meanings and memories within digital space, and acknowledge that the notion of place is also critical to the development of technology in interaction design. It is the use of space by people, their memories, their history and meanings that create the experience of place (Harrison & Dourish, 1996) and that people are the essence of place. From their research within interaction design, Harrison and Dourish (1996) state that the critical factors contributing to the creation of place rely on the ability for users to participate, adapt, and appropriate. These factors are useful in the development and measurement of place within this research.

Hybrid Space

Harrison and Dourish (1996) define hybrid space as “one which is comprised of both physical and virtual space, and in action is framed simultaneously by the physical space, the virtual space and the relationship between the two,” (p.72). In Dourish’s paper from (2006) he re-examines the role of technology in the creation of space and place and states, “is it time, perhaps, to re-space place. More importantly, it is important to see both as critical aspects and products of the circumstances of interaction,” (p.8). Dourish acknowledges hybrid space, and that place can occur in either physical or virtual space however he does not go on to investigate the potential for place to occur in both simultaneously.

The paper by Adriana de Souza e Silva (2006) continues to build upon this idea of hybrid space while specifically examining the use of mobile technologies as interfaces between the

digital and physical environments. Souza e Silva (2006) states, “Hybrid spaces are mobile spaces, created by the constant movement of users who carry portable devices continuously connected to the Internet and to other users.” Through the use of mobile technologies one is continually connected to the Internet while navigating through the city, therefore the space in which the user exists becomes hybridised. Souza e Silva conceptualises hybrid space on three trends: “hybrid spaces as connected spaces, as mobile spaces, and as social spaces,” (p.261). From Souza e Silva’s definition of hybrid space one can understand that it is created by the merging and blurring of borders between physical and digital spaces due to the use of mobile devices however it is not constructed by technology, “..it is built by the connection of mobility and communication and materialised by social networks developed simultaneously in physical and digital spaces” (2006, p.266). Therefore the mobile technology assists in connecting people with one another in digital and physical spaces. Although Souza e Silva’s research is extensive in discussing hybrid space, it does not discuss how these connections affect people’s experience of place.

Media Space and Media Architecture

“Media spaces integrate audio, video and computer technology to provide a rich, malleable infrastructure for workgroup communication across time and space,” (Harrison & Dourish, 1996, p.70). In media spaces people have a tendency to appropriate space, and give them personal meaning, creating memories out of the media space, therefore experiencing place (Harrison & Dourish, 1996, p.70).

The discipline of architecture focuses on designing the physical infrastructure of the built environment in response to the needs of society, reflecting culture through materials and forms. The integration of media spaces into architecture provide infrastructure for the development of hybrid space. The physical boundaries of the built environment become blurred through the integration of media such as computer technologies connecting the physical environment with the digital. Media architecture has the potential to combine digital and physical spaces by materialising information through interactive public screens, 3D projection mapping, amplified or augmented reality, digital fabrication and other technologies, which inform hybrid space. The question remains, how does media architecture inform the creation of hybrid place? How do media and architecture come together to affect

the experience people have within space to create hybrid place? A couple of examples will be explored in more detail.

Digital Fabrication within Architecture

There is the potential for architectural design to become socially responsive and interactive through the use of digital tools and digital fabrication methods to translate digital information into tangible formats and hybrid space (Foth et al., 2011).

“Architecture continually informs and is informed by its modes of representation and construction, perhaps never more so than now, when digital media and emerging technologies are rapidly expanding what we consider to be formally, spatially, and materially possible,” (Iwamoto, 2009). Digital fabrication is a method of creating physical outputs from digital data, relying on computer driven tools. The machinery, tools, and processes within digital fabrication stem from aerospace, naval, and automotive industries (Kolarevic, 2003). Since the late 1990s the architectural discipline has been conducting applied design research relying on digital fabrication methods. Digital fabrication has been described as revolutionising design through the ability to test and experiment complex forms and concepts (Iwamoto, 2009). Time and material intensive approaches to design can be reduced through the use of digital fabrication tools by eliminating steps from design to production (Sass, 2007).

Fabrication processes are described as subtractive or additive methods (Seely, 2004). Computer Numerical Control (CNC) methods create physical objects through the removal of material. Alternatively rapid prototyping processes fabricate objects by adding and building up layers of materials (Seely, 2004). The wide range of digital fabrication tools combined with traditional construction methods have stimulated the Architectural discipline to explore formal and material possibilities while promoting the process of making. The output of digital fabrication tools is limited to the scale of the equipment and the materials that are used ranging from representation models to the creation of 1:1 building components. Digital fabrication methods have been appropriated within the architecture discipline as a means to convey digital information through physical and tangible artefacts.

Digital Fabrication: From bits to atoms

Since 1997 Hiroshi Ishii of the Tangible Media Group MIT, has conducted considerable research in bridging “the gap between cyberspace and physical environment by making digital information (bits) tangible,” (1999, p.23). Ishii’s focus has been on bringing the immaterial bits of the digital space into the physical space through developing the physicality of digital interfaces as the connection between digital and physical spaces, known as Tangible User Interfaces (TUIs) (Souza e Silva, 2006, p.265).

The main challenge in Ishii’s research has been the seamless transition of the physical affordances of objects and their physical properties into the digital environment. The purpose of TUIs is to allow digital information to be physically manipulated by the users hands, allowing a haptic interaction. The physical forms become controls and representations of the digital information (Ishii, 2008, p.16). The materials and objects that Ishii has utilised in his research are relatively low-tech and familiar to the everyday user, such as modelling clay, blocks of wood, plastic bottles, etc. The objects are connected to the interface and manipulate the digital information.

Typically in architectural applications of digital fabrication the digital information informs the physical output and creation of physical objects or prototypes. There is a lot that can be learned from Ishii’s research, which can be explored further by questioning how TUIs have affected the experience people have within the digital or the physical space and whether TUIs have a role to play in the development of hybrid space or hybrid place.

Trends in Digital Fabrication

Neil Gershenfeld from MIT discusses the future where there will be personal manufacturing machines, “..like the earlier transition of mainframes to PCs, the capabilities of machine tools become accessible to ordinary people in the form of personal fabricators (PFs)...implications are likely to be even greater because what’s personalised is our physical world of atoms rather than the computer’s digital world of bits,” (Mota, 2011, p.279).

Digital fabrication machines and tools turn digital information (bits) into atoms through the subtraction or addition of materials to create physical objects from digital information and designs. The benefits of these fabrication tools are the abilities to create one of-a-kind parts,

which can be individualised and personalised. Due to the additive nature of some of the tools, minimal waste is created.

The cost of digital fabrication tools has significantly decreased and is becoming more accessible to a larger part of the population. In 2001, 3D printers tended to cost \$45,000 US dollars, in 2011 personal 3D printers cost between \$1000-10,000 US dollars (Mota, 2011, p. 280). Based on this continuing trend it is thought that 3D printers will become a part of every household, similar to laser printers. Many factors contribute to the significant cut in costs for 3D printers, including the development of technology and materials however most importantly is the exchange of information surrounding the use and development of these tools. Knowledge sharing across the globe via social networks and community groups within the digital and physical space has supported the development of digital fabrication tools. Two of these community groups are MIT's FabLabs and Hackerspaces.

The MIT FabLabs began out of the Center of Bits and Atoms as a workshop aimed at providing self-replicating tools to communities. Currently there are 89 FabLabs in 23 countries (<http://fab.cba.mit.edu/about/labs/>). Hackerspaces are informal learning spaces that are community operated and promote collaboration. Hackerspaces are a direct response to the needs and interests of the community who participate within them, most of which will incorporate digital fabrication machinery and tools within their workshop space (Mota, 2011, p.280). Mota attributes the success of digital fabrication to the Do-It-Yourself (DIY) movement, which is based on self-improvement through the development of new skills and knowledge (2011, p.283).

“Access to tools capable of turning digital designs into physical objects, coupled with the ease with which digital files can and are being modified and circulated, is bringing a third dimension to the practices of sharing, mashup and remix, and giving everyone the opportunity to not only reinvent and shape the world of bits, but also the world of atoms. The next decade will tell if indeed, as Doherty suggests, more than consumers, we are makers,” (Mota, 2011, p.286). Similar to the notion that digital fabrication has returned craft to architects and designers; digital fabrication along with the affordances of digital space and networks is increasing expression of personal creativity and the power of making throughout communities across the globe.

Digital Fabrication & The Internet

Social media is a powerful and pervasive trend not just in media and communications but also in associated fields such as architecture and urban design. Social media and Web 2.0 services along with the development and wide uptake of smart mobile devices have changed the way that people live and communicate (Kolbitsch & Maurer, 2006).

Web 2.0 technologies has provided for the creation of communities revolving around access to information regarding digital fabrication ranging from wikis, blogs, podcasting, file sharing, and social networking (Kolbitsch & Maurer, 2006). The power behind these tools lies in two areas: Firstly, the vast amount of the population who interact with social media, “If Facebook were a country it would be the world’s 3rd largest and 2x the size of the U.S. population” (Qualman, 2012), and secondly, the fact that social media allows for more individuals to participate and have a voice amongst the ample area of the internet (Foth et al., 2008).

The critical factor to the success of emerging technology within the web is the bottom up approach where the users become the creators. This is a fundamental shift in thinking which encourages innovation within the development of new content (Kolbitsch & Maurer, 2006). How can this similar approach where the experience is created by the user, be utilised in the design of hybrid place?

Hybrid Place

As discussed previously, the use of digital fabrication tools provides methods for creating physical atoms from digital bits. Would it be possible for digital fabrication to be the method in which to capture and materialise digital environments that would inform our working, playing or learning parts of life? Can place be redefined based on the interaction and experience of both the digital and physical world, creating hybrid place? The opportunity for digital fabrication is not only in the translation of digital information into physical objects, it is the empowerment of the individuals to express themselves. The individual is the creator of the digital information in order to create the physical artefact through different digital fabrication methods. Through this process the individuals are expressing themselves and contributing to the overall experience of a space. The creative process from digital to physical

is memorable and powerful allowing the user to contribute to the shift in meaning of the space into a hybrid place.

Exemplars

Two case studies are discussed in this paper serving as examples of how media and architecture come together to create hybrid places.

The Russian Pavilion

The Russian Pavilion shown in figure 1, at the Venice Biennale 2012, uses QR code technology as links between the digital and the physical environments of the exhibition. The QR codes covered all the walls, floors, and ceilings of the pavilion. Participants use tablet computers to read the QR codes linking them to a central website that explores ideas for a new Russian City for science (Etherington, 2012). This pavilion was awarded a special mention by the Jury of the Architecture Biennale (Basulto, 2012) signifying that it was acknowledged as a good piece of design and highly regarded by the architecture community. The pavilion is unique in its design, the aesthetics created by the QR codes on all the surfaces, the content of the exhibition, and the experience of the users.



Figure 4. Russian Pavilion. Source: Ian Weir

Sergei Tchoban and Sergey Kusnetsov of the design practice called SPEECH Tchoban & Kusnetsov curated the exhibition. When discussing the design idea behind the pavilion the curators say, “In our pavilion we have tried to find an architecture metaphor for connecting the real and the virtual. People today live at the intersection of on-and off-line; ‘our common ground’ is becoming a cipher for infinite mental spaces,” (Etherington, 2012). The commissioner of the pavilion stated, “We have created a space that is physical and virtual at the same time” (Alice, 2013). From these quotes the design intention is very clear where the purpose of the pavilion was to combine media and architecture to explore how these digital and physical environments inform each other. The special mention award and the media attention received by this pavilion indicate that society recognises the value and opportunities for architecture to actively explore the connection between digital and physical environments.

Although the link between the digital and the physical environment of the pavilion is incredibly clear what is lacking in this exhibition is the ability for the user to participate or contribute to the creation of place. In figure 1, one can see that the room is filled with visitors however they are all focusing on the tablet computer and there appears to be a lack of face-to-face interaction amongst them. According to the critical factors for assessing place, as described by Harrison and Dourish (1996), the Russian Pavilion does not allow users to adapt or appropriate the content of the exhibition. Users participate but not in an active way, they are merely observing and learning from the content however they are not contributing to it.

Although the experience of engaging with the pavilion is possibly memorable to the users due to its unique design, the experience of place is questionable. How much meaning would the people attach to the pavilion when the face-to-face interaction is not promoted? The use of the technology evidently serves the purpose to connect to on-line content important to the exhibition however the use of the technology can be seen to detract from the human experience within the pavilion. The opportunity for the individual to contribute to the experience of the space and place is relatively limited and could have been explored further in this pavilion.



Figure 5. Users create a shadowgram. Source: Ars Electronica Futurelab.

In 2010 the Ars Electronica Futurelab in Linz, Austria developed *Shadowgram* as a way of combining the creation of a tangible object with the notion of social brainstorming. Social brainstorming, a term developed by this group, describes the dynamic process of stimulating creativity and inspiration from other people (Gardiner et al., 2011). The process of creating a shadowgram allows users to pose in front of a camera to take an image of their shadow. The shadow is then cut out of adhesive vinyl producing a sticker, to be placed on the wall of the installation. Users have the opportunity to attach a speech bubble to the shadow and write a comment. The intention for the comments is to create dialogue between the local communities.

Social fabrication, another term developed by the Futurelab, has been defined as “a type of fabrication for shared creation with others in public spaces” (Ogawa et al., 2012, p.58). The purpose of this concept is to promote communication within society through the illustration of individual or collective perspectives. These terms come together to define the notion developed by the Ars Electronica Futurelab as the Creative Catalyst, where creativity is

produced through the participation of individuals and the content is generated by the people, "the output has significance for individuals and for the collective," (Ogawa et al., 2012, p.58).

Researchers from the Carnegie Mellon University, Willis et al. (2011) have defined interactive fabrication, which incorporates real time input by the user to directly produce fabrication by sound or shape. The purpose of interactive fabrication is to bring back the craft power to the user providing new creative opportunities. Fundamental to these alternative fabrication methods is the interaction of the user for creative expression.

When assessing the creation of place in *Shadowgram* against the principles mentioned by Harrison and Dourish (1996) it is understood that the users actively participate in the adaptation and appropriation of place through the creative catalyst process. *Shadowgram* allows users to participate in the creation of hybrid place by connecting the digital with the physical layers of the built environment. The purpose of *Shadowgram* is to encourage interaction between users while allowing them to express a part of themselves. This installation promotes the unique potential of digital fabrication where the digital content created by the individual and the physical artefact that occupies the space is a personal expression of that person. It is the connections that are facilitated between the participants through every part of the process that create a memorable experience in both the digital and physical space, therefore exemplifying hybrid place.

What can be learned from these examples? The Russian pavilion is a provocative step towards blurring the edges of digital and physical space. The architecture provides the infrastructure for the digital layers of the environment to be accessed and experienced. In order to make the overall experience more meaningful to the participant, opportunities for the participants to express themselves or contribute to the overall experience could be explored further. The success of *Shadowgram* can be attributed to the fact that people had the ability to create something that reflected them while contributing to a larger discussion that was relevant and of interest to the broader community.

Conclusion

Although the case studies discussed in this paper are of a small scale in relation to urban environments a few critical factors can be highlighted which can be scaled up to affect design

on multiple levels. The experience of place can occur anywhere in any space. The use of technology in our everyday lives is continually evolving and becoming more and more ubiquitous. The Russian pavilion makes a strong and clear statement acknowledging that the digital environment cannot be ignored and should be included in the design of our physical environments. Although accessing digital information can be informative it can also restrict the purpose of architecture and design, which is to create spaces for the experience of people.

The proposition of hybrid place is to embrace the affordances of technology to improve the overall human experience within built environments. The technology can be used to promote interaction amongst people allowing for the expression of individuals and creativity. Screen based media architecture are evolving to become more and more interactive however the screens are currently limited to 2-dimensional interaction. Although augmented reality is an exciting opportunity to continue to develop the blurring between the digital and the physical environments it is only capturing the phenomena of a purely visual sense. The creation of tangible artefacts through digital fabrication methods promotes the process of making, individual expression, and includes a multidimensional and sensory experience.

Based on the work by Lentini and Decortis (2010) who established a framework for determining the potential for technological devices to support experiences of place, of particular interest to the future of this research will be; to encourage the physical exploration of the environment, enable the discovery of the environment through the senses, empower the users through responsibility and value, “elicit face-to-face interactions and favour rich collective experiences between users,” (p.414).

The intention of this research is to develop the concept of Social and Interactive Fabrication further. This can be done by producing a small installation within a large Australian university to act as a “Creative Catalyst”, to promote a collective creativity experience through the process of making. Digital fabrication technology such as 3D printing and laser cutting while questioning the experience and definition of hybrid place will be explored. Similar to the work of Lentini and Decortis (2010) the aim of the installation will be to promote face-to-face interaction of people through the use of technology therefore combining the digital and physical layers of the urban environment. The involvement of users through

creative collective and face-to-face interactions provokes opportunities of hybrid place by providing memorable experiences.

2.2 DIY Media Architecture: Open and Participatory Approaches to Community Engagement

Statement of contribution of co-authors for thesis by published paper

The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 2.2:

Caldwell, Glenda Amayo & Foth, Marcus (2014) DIY media architecture: Open and participatory approaches to community engagement. In Dalsgaard, Peter & Fatah gen Schieck, Ava (Eds.) *Proceedings of the 2014 Media Architecture Biennale*, ACM, Aarhus, Denmark, pp. 1-10.

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDAL CALDWELL	Chief investigator, significant contribution to the planning of the paper, literature review and writing manuscript
SIGNATURE	QUT Verified Signature
DATE	18 July 2016
PROF MARCUS FOTH	Significant contribution to the planning of the paper (as associate supervisor) and assisted with the preparation and evaluation of the manuscript

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

[QUT Verified Signature](#)

Mirko Guaralda

18/07/16

Statement of Contribution

This paper was co-authored with Prof Marcus Foth. We jointly discussed the development of the concepts and ideas to be included in the paper and the paper structure. I wrote the main body of work and Prof Foth wrote parts of the discussion and conclusion. Together we revised and edited the paper as well as presented it at the Media Architecture Biennale in Aarhus Denmark, 2014. I am grateful for the guidance and contributions that Prof Foth provided through the writing of this paper. His vision and expertise has helped me to see how this research fits into a broader spectrum of work and contributes to the ongoing discussion of citizen participation and control in the making of cities.

Preamble

The Media Architecture Biennale is the only academic conference which specifically focuses on the topic of media architecture. Therefore it was a targeted venue for the publication of this paper as it presented a comprehensive review of media architecture typologies and existing theories behind the DIY movements to propose DIY/DIWO media architecture. The composition of this paper occurred at a time where academics and practitioners within the field were beginning to question the impact and meaning of media architecture as something beyond pretty lights and digital facades. By exploring the motivation behind bottom up approaches and DIY movements it is evident that people become activated and make changes to their environment when they have something to say. The sharing of knowledge through open sourcing information is a valuable aspect of these movements. This paper which highlights both of these points laid out the framework for the design and implementation of design intervention #3 as a prototype of DIY/DIWO media architecture, the InstaBooth as discussed in chapter 5.

Caldwell, Glenda Amayo & Foth, Marcus (2014) DIY media architecture: Open and participatory approaches to community engagement. In Dalsgaard, Peter & Fatah gen Schieck, Ava (Eds.) *Proceedings of the 2014 Media Architecture Biennale*, ACM, Aarhus, Denmark, pp. 1-10.

Abstract

Media architecture's combination of the digital and the physical can trigger, enhance, and amplify urban experiences. In this paper, we examine how to bring about and foster more open and participatory approaches to engage communities through media architecture by identifying novel ways to put some of the creative process into the hands of laypeople. We review technical, spatial, and social aspects of DIY phenomena with a view to better understand maker cultures, communities, and practices. We synthesise our findings and ask if and how media architects as a community of practice can encourage the 'open-sourcing' of information and tools allowing laypeople to not only participate but become active instigators of change in their own right. We argue that enabling true DIY practices in media architecture may increase citizen control. Seeking design strategies that foster DIY approaches, we propose five areas for further work and investigation. The paper begs many questions indicating ample room for further research into DIY Media Architecture.

Categories and Subject Descriptors

Human-centered computing~Interaction design theory, concepts and paradigms; Applied computing~Architecture (buildings); Applied computing~Media arts

Keywords

Media architecture; do it yourself; DIY; do it with others; DIWO; maker culture; participation; engagement; citizen control

Introduction

The discipline of Media Architecture is developing and growing as designers, architects, and planners realise the practice and promise that the combination of digital media and architecture can provide to enhance the experience of the built environment. Not only do the professionals in these disciplines need to consider how to incorporate the use of technology into the development of their profession, but they need to understand how technology can be used to improve how people engage with the built environment.

According to Brynskov et al. (2013, p. 1-2), “*Media Architecture is an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities.*” Media façades are a typical example of media architecture, i.e., building surfaces that can display purposeful information using, e.g., light or projected animations to express changing moods of the occupants of a building. In this paper, we explore the coming together of the three main elements in the creative process of developing Media Architecture: the tangible platforms (façades and other physical material); digital media (smart phone, screen applications, etc.), and; design approaches. In doing so, we examine how to bring about and foster more open and participatory approaches to engage communities, and which part of the creative process depends on the craft and technical skill of experts. We are interested in identifying novel ways to put some of the creative process into the hands of laypeople, and in investigating the impact this may have on community engagement and citizen control.

This paper first explores DIY (do it yourself) and DIWO (do it with others) phenomena by looking closer at three categories of approaches and practices: DIY in *technical* domains (section 2), *spatial* domains (3), and *social* domains (4). We review and analyse each area to then synthesise our findings to propose a variation of Media Architecture that we call DIY Media Architecture. We examine some of the commonalities that may bring these related DIY fields together and what motivates the DIY cultures, communities, and practices. The aim of this paper is to animate and contribute towards a wider discourse. We ask if and how media

architects as a community of practice should encourage and foster to ‘open-source’ our tools and approaches in order for laypeople to not only participate but become active instigators of change in their own right.

Technical DIY: Maker Culture

In his book “Making is Connecting,” Gauntlett (2011) discusses the shift from Web 1.0 to 2.0 as becoming a “communal allotment” where the ability to share information, ideas, and creations became a reality encouraging participation and collaboration. *“Rather than just seeing the internet as a broadcast channel, which brings an audience to a website (the ‘1.0’ model), Web 2.0 invites users in to play. Sites such as YouTube, eBay, Facebook... are clearly better the more people are using and contributing to them,”* (Gauntlett, 2011, p. 7). The ability to connect and communicate through Web 2.0 (Kolbitsch, & Maurer, 2006). with people all over the world has assisted not only in the organisation and establishment of networks supporting real-world activities (Gauntlett, 2011), but also what Gordon and de Souza e Silva call “net localities” (2011).

As interests in digital activities surge, there has also been resurgence in the practice of craft culture (Francisco, 2007). The value of craft lies in the skills required to create handmade and unique artefacts as opposed to the skills of the expert elite (Gauntlett, 2011). The notion of DIY arose out of the open-sourcing of craft so that the skills and knowledge required to create, was accessible to anyone and not a matter of affordability that arose from “American optimism, and communicated in a cheerful and unpretentious way” (Gauntlett, 2011, p. 49). We note the difference between the craft world and art world and acknowledge that those in the pursuit of making may primarily seek neither fame nor fortune, but the enjoyment of the experience of making and creating and sharing artefacts.

Opting for a DIY approach is sometimes based on an implicit decision to oppose consumerism and instead promote individual creation that often goes beyond the material or tangible artefact, as it spills over into the crafting of experiences as well. With the combination of Web 2.0 networking and an increasing interest in making things yourself, the DIY culture has gone beyond the craft world to encompass the development and sharing of

technological knowledge, what is referred to as the maker and hacker cultures (Anderson, 2012).

The maker culture promotes informal environments supporting peer to peer learning and learning through making, regarding mechanical and technology driven interests such as 3D printing, computer numerically controlled (CNC) machining, soldering, tinkering, robotics, metal and woodwork. Hackerspaces and FabLabs are examples of “maker spaces” which are found across the globe, with an increasing prevalence in public libraries (Bilandzic, 2013). Out of the Center of Bits and Atoms at MIT, the FabLab initiative arose as a workshop aimed at providing self-replicating tools to communities. Currently there are 89 FabLabs in 23 countries according to fabfoundation.org. Hackerspaces are community operated informal learning spaces that promote collaboration (Bilandzic, 2013; Caldwell, 2013). Hackerspaces typically house digital fabrication machinery such as 3D printers and CNC routers in addition to soldering and woodworking tools. Mota (2011) describes the creation of Hackerspaces as a direct response to the needs and interests of the community who participate within them. The success of digital fabrication is attributed to the DIY movement, which is based on self-improvement through the development of new skills and knowledge: *“Access to tools capable of turning digital designs into physical objects, coupled with the ease with which digital files can and are being modified and circulated, is bringing a third dimension to the practices of sharing, mashup and remix, and giving everyone the opportunity to not only reinvent and shape the world of bits, but also the world of atoms. The next decade will tell if indeed... we are makers,”* (Mota, 2011, p. 286). The affordances of digital networks combined with a resurgent interest in craft culture and DIY movements reflect the power of personal creativity and making throughout communities across the world (Caldwell, 2013).

The hacker culture comes from a community that has a passion for computers, their development, and a strong belief that information should be free, specifically Free Open Sourced Software (Milberry, 2014) and is based on Castells’ ideals of *“individual freedom, independent thinking, and of sharing and co-operation”* (Ratto & Boler, 2014, p. 24).

Acknowledging the importance of the amateurs or lovers, in the evolution of technology, Paulos supports DIY cultures and calls on technologists and engineers to shift their thinking towards more participatory collaborations and innovations. He encourages ubiquitous

computing researchers to enable participation from the everyday citizen to address global issues such as climate change, famine, and poverty (Paulos, 2012; Paulos, 2013).

Similar to the shift to Web 2.0 that allows users to create digital content, tinkering platforms have been developed assisting more people to participate in hacking and making. The development of primarily open-sourced and off-the-shelf hacker tools have made it possible for anyone to combine micro-controllers with sensors to build experimental computing for individual purposes (Dade-Robertson, 2013). Such tools streamline the process so that users do not need extensive knowledge in computer science, programming or electronics in order to create interactive environments, citizen science sensor networks, robots, or drones themselves. Such platforms and tools include: Arduino, Wiring, Raspberry Pi, MakeyMakey, Ninja Blocks, Beagleboard, SmartCitizen.me, Phidgets, Teensy, and many others.

Spatial DIY: Placemaking

The crafting of place, DIY placemaking is a concept we describe that encompasses a range of urban interventions for the purpose of appropriating public spaces to assist in civic engagement, the communication of often political messages, or to simply improve the quality and experience of a place. Examples of DIY and DIWO placemaking practices include guerrilla gardening and seed bombing, guerrilla knitting / yarn bombing, parkour and graffiti, which we will now discuss in turn.

The aim of guerrilla gardening is to turn abandoned city spaces into beautiful gardens. Guerrilla gardeners are armed with shovels, hoes, plants, and watering cans all used to plant flowers, vegetables and herbs in unused spaces (Gilsenan, 2011). Key characteristics of guerrilla gardeners are the use of quick surprise attacks on neglected and weed encroached parts of the neighbourhood (Gilsenan, 2011). Although there is a parallel drawn between the guerrilla soldiers and gardening warriors, guerrilla gardening movements are seen to be peaceful movements which provide colourful, sometimes edible responses to overgrown and abandoned areas within the urban spaces we live in.

“Guerrilla knitting is defined as a range of practices that employ ‘vigorous’ or ‘militant’ knitting activity in mass demonstrations, in urban interventions, and for political causes, using knitting in controversial, unusual, or challenging ways” (Orton-Johnson, 2014, p. 143).

The juxtaposition of the tangible, tactile, and colourful characteristics of knitting in an urban setting such as around a park bench or bike rack (Fig. 1), makes the presence of knitting felt and known to the city dweller.



Figure 6. Yarn bombed bike rack. [Eli Carrico, Flickr CC]

Corbett and Housley wrote *“The Craftivist Collective Guide to Craftivism”* (2011) which defines craftivism as the promotion of human rights issues through the combination of activism and craft.

Crafts such as cross-stitching are used as tools to spread the message while activism is the core goal of craftivist projects (Caldwell et al., 2013; Corbett & Housley, 2011). . Crafted or handmade objects placed in the built environment reflect the efforts of the people who made them and therefore increase the engagement and respect that the general public have for such objects compared to mass produced and off-the-shelf objects (Caldwell et al., 2013; Corbett & Housley, 2011). The political choice to not buy but to create something for yourself, is how

crafts such as knitting, weaving, gardening, cooking, and sewing have taken on activist characteristics (Gauntlett, 2011).

The craftivist collective relies on a central website (craftivist-collective.com) to organise projects and people across the world. The website collects images and information about the projects in order to display the impact of their collective efforts (Caldwell et al., 2013; Corbett & Housley, 2011). The collective also uses a range of social media to promote craftivism to a wide range of people (Caldwell et al., 2013; Corbett & Housley, 2011).

Parkour is an urban play form where the player (traceur) relies on calisthenics and gymnastics to traverse through the built environment (Rawlinson & Guaralda, 2012). It is a creative reinterpretation and a sensory experience of space. The perception and understanding of the material form and feeling of the city is heightened as the traceur moves over and between buildings, bridges, walls, etc. The playful activity of parkour is challenged by the boundaries created by the built environment, and it is the overcoming of these obstacles that generates feelings of empowerment and ownership of physical space. *“Parkour’s emotional connection with place comes as a result of both the sensually intimate nature of Parkour activity and the use of a conceptual frame highly integrated with the urban context”* (Rawlinson & Guaralda, 2012, p. 9). The urban experience that parkour offers, although not necessarily illegal, does illicit conflict with the normative regulations, ownership boundaries, private space, etc. Parkour exemplifies the DIY appropriation of public space for the crafted physical experience of the city for purposes of fitness and exercise.



Figure 7. Graffiti. [Jungla, Flickr CC]

Graffiti is often viewed as an act of vandalism and therefore considered against the law in many cities. Iveson argues that, “*graffiti writers demonstrate by their actions that they do have a right which is denied them by law – the right to use the surfaces of the city as a medium of public expression. The ‘right to the city’ is a cry, a demand and a lived experience in the face of exclusion,*” (Iveson, 2010, p. 436). Research into graffiti found that it is a complex form of expression where individuals purposefully affect urban environments through their art, where the right to public vs. private space becomes contentious. Graffiti blurs the edges between property and behaviour codes, and is seen to construct “a sense of place where sociality is in question” (Dovey et al., 2012, p. 39). Graffiti writers usually do not wait for permission or seek formal approval, they do it for themselves, and therefore we consider them to be part of DIY place-makers.

Graffiti writers tend to consider their work as a way to bring vibrancy and colour to dull urban spaces (Schacter, 2008) that are often forgotten (Fig. 2). They use their skills and art form as a means to appropriate public space from corporate business or entities. “Graffiti writing was a protest at this ‘corporatisation’ and an attempt to engage with the urban landscape in a way that represent more than private commercialism” (Rowe & Hutton, 2012, p. 78). Rowe and Hutton (2012) conclude that graffiti is a connection between the writer and the urban landscape. It is an artform that is filled with cultural meaning and highly

appreciated by its community. The creation of place through graffiti has been questioned and studied by Dovey et al. (2012) who conclude, “While it is applied to and erased from urban surfaces, it is more than a veneer applied to the urban fabric because of the deeper social identifications it both facilitates and expresses. The graffiti, like the sense of place, is deeply ingrained without being deeply-rooted as essence; it is immanent rather than transcendent,” (Dovey et al., 2012, p. 38).

Social DIY: Urban Citizenship

Having introduced notions and examples of DIY and DIWO movements in both technical and spatial domains, we now briefly discuss two examples of DIY in the social domain – DIY citizenship and DIY urbanism.

In an attempt to link and understand the individual actions, the blurring of borders, the overlapping interests and motivations, we believe there are two key concepts that provide a bigger picture description of what these DIY phenomena mean in a social and urban context. First, Ratto and Boler propose, “*DIY citizenship, [as] a term intended to highlight the diversity of ways citizenship is enacted and performed,*” (2014, p. 4). This concept focuses on digitally mediated practices where people rely on social media and Web 2.0 for the sharing of content, ideas, and information to create global communities with interests ranging from political action, craft, design, science, and technology. This open sourcing of information can also be viewed as political as it questions the rights of public vs. private property and challenges boundaries of authority (Ratto & Boler, 2014). DIY citizenship asks how people and communities are using creative ways to shape, alter, and rebuild their environments to be how they want them to be and not how they must be. DIY citizenship goes beyond standard political actions such as voting but is about participation, diversification, and social interventions.

Second, Iveson (2013) proposes DIY urbanism as a link between the small actions and appropriations of urban space such as the ones mentioned previously (Guerrilla Gardening, Parkour and Graffiti) into a larger understanding or vision that affects the socio-cultural experience of cities. What links these small actions is that the inhabitants of the city imagine and create a tailored city within the city by occupying or transforming urban spaces through

the injection of new meanings and functions (Iveson, 2013). These inhabitants are motivated by their own purposes and often operate at the fringes or even outside existing policies and laws, they take action upon their rights as inhabitants of the city.

Towards Citizen Control

Dade-Robertson (2013) makes the analogy between Graphical User Interfaces (GUIs) of personal computers with how he defines *Architectural User Interfaces* (AUIs) as buildings that mediate between computational information and people. In so doing, he connects the disciplines of architecture and human-computer interaction (HCI), arguing that not only does media and technology affect how people experience urban environments, architecture similarly has an affect on the development of computer technologies (Dade-Robertson, 2013). He believes that through the rise of ubiquitous computing the value of physical environments has been re-acknowledged increasing the opportunities for architectural influence on the evolution of HCI practices. The call for architectural knowledge and input into HCI research is reinforced by Fischer et al. (2013) who claim that the architecture provides spatial understandings that can assist in the development of urban HCI systems. They argue that through an architectural approach public displays can be refocused “*for a city beyond information and utility*” (Fischer et al., 2013, p. 39).

As the UK graffiti artist Banksy states, “twisted little people ... go out everyday and deface this great city. Leaving their idiotic little scribblings, invading communities and making people feel dirty and used. They just take, take, take and they don’t put anything back. They’re mean and selfish and they make the world an ugly place to be. We call them advertising agencies and town planners” (cited in Sliwa & Cairns, 2007, p. 78). As some like Banksy may think that media architecture – if not considered and appropriated properly – runs the risk of polluting the city with more advertising and media ‘junk.’

We would like to ask how can media and architecture be combined to help people take control, appropriate place, and create communities. Acknowledging that media architecture is an emerging field that combines people, place, and technology in a similar way to related hybrid practices such as urban informatics (Foth et al., 2011), it has an effect on the way the

city is experienced and how people come together. This paper seeks to question what role will it have in facilitating communication and the interaction of city inhabitants?

To explore this question we have identified existing examples of the ways in which media and architecture are currently combined to consider how they are communicating and interacting with the cities in which they exist. Based on works by Verhoeff (2012), Arnstein (1969) and Foth et al. (2013), we revise Fritsch and Brynskov's scale of interactivity (2011) by presenting attributes as independent qualities rather than a strict hierarchy. We further extend their work by proposing additional characteristics of media architecture, the notions of *performative* and *citizen controllable*. The attributes are not intended to be linear or progressive; they can be understood as qualities that can occur in parallel or alongside to one another.

Static Dynamic Reactive Interactive Participatory Communicative
 Performative *Controllable*

We employ these attributes of interactivity to assess the quality of select examples informing how they are used, to ultimately propose a variant approach to media architecture, that is, DIY Media Architecture. What can be learnt from these examples to identify opportunities for further development and ultimately push the boundaries to promote a higher level of community engagement through media architecture, one that is based on the appropriation of urban spaces by city dwellers?

The following sections examine a range of media architecture examples from across the world that range from large-scale buildings to small-scale installations; media façades, media structures, digital urban screens, media projections, and tangible media architecture interfaces.

Media Façades

The Star Place, Kaohsiung, Taiwan (Fig. 3), designed by UNStudio in 2008 is an example of a dynamic media façade. As described by Haeusler et al. (2012) the Star Place façade is designed to reflect the luxury shopping experience offered by the building. The media façade is animated by coloured lights, "*that respond to the building's setting and*

purpose” (Haeusler et al., 2012, p. 27). Based on the interactivity scale this piece of media architecture is an example of a dynamic façade.

- Static
- Dynamic**
- Reactive
- Interactive
- Participatory
- Communicative
- Performative
- Controllable



Figure 8. Star Place, Taiwan. [Mastahanky, Flickr CC]

The façade provides little opportunity for individuals to interact directly with it. The façade is used to attract the attention of people and to promote the status of the building and those that occupy it. The combination of media and architecture in the Star Place building is an example of a top-down approach where the property owners, architects, and designers direct the media onto the street and urban environment providing no possibilities for people to direct their own media or information onto the façade. The media façade was part of the initial design and integrated into the building’s form and structure.

The **Ars Electronica Center** in Linz, Austria (Fig. 4), is an example of media architecture that reflects the meaning of the building itself through its dynamic and interactive façade.



Figure 9. Ars Electronica Center. [Rubra, Flickr CC]

As stated on their website, *“The Ars Electronica Center is the architectural expression of what Ars Electronica is all about: a place of inquiry and discovery, experimentation and exploration, a place that has taken the world of tomorrow as its stage, and that assembles and presents influences from many different ways of thinking and of seeing things.”* In keeping with the Ars Electronica festival, which combines art, technology and society, the building provides spaces for conferences, research, exhibitions, workshops, research and development (Haeusler et al., 2012). The media façade consists of a glass skin with 40,000 LEDs that is made available to designers, artists, and researchers. In some instances, it has been used to explore the interaction of people through mobile phones. This building has been designed and created to go beyond dynamic and encourage interaction and participation from the public.

- Static **Dynamic** **Reactive** **Interactive** **Participatory** Communicative
- Performative Controllable

In one example of its use, participants from the general public – via a digital music player – were able to plug into the building façade where it then reacted creating a lightshow performance based on the music the individual chose to play. Allowing users to plug into the façade and select music enables them to control the content of the façade. The media façade

of this building was also an integrated part of the building design that informed its form, structure, and materiality.

Media Structures

D-Tower is an interactive public artwork created by architect Lars Spruybroek from NOX-architekten and artist Q.S Serafijn who were commissioned by the City of Doetinchem, The Netherlands in 1999 to 2004 (Fig. 5). The purpose of D-Tower is to record feelings of happiness, fear, love, and hate expressed by the city inhabitants through a web based questionnaire. The website collects answers from participants and calculates the overall mood of the city. The D-tower lights up at night to show the dominant feeling based on the colour displayed.



Figure 10. D-Tower. [Hugo-Photography, Flickr CC]

The D-Tower is dynamic by reacting to the information provided by the submissions collected on the website. The tower does not provide for direct interaction from people on the street but does call for a larger participation via the website which is then communicated back to the community.

- Static **Dynamic** **Reactive** Interactive **Participatory** **Communicative**
- Performative Controllable

The D-Tower was designed and constructed to specifically include media and technology in its architecture for the purpose of encouraging participation from the city community.

Urban Screens

Discussions in Space (DIS) is a situated engagement tool that promotes public participation through a digital public screen (Schroeter, et al., 2012). Users can send a message via SMS, Twitter, or a web based platform to the screen. The purpose of DIS is to expose context specific questions about place to encourage everyday people to be involved in the discussion regarding local issues and have their say. Discussions in Space has been used at Federation Square in Melbourne since 2011 (Fig. 6). It forms part of the regular programming of their iconic big screen and engages with visitors during events such as Oprah's visit, New Year's Eve, Cadel Evans' 2011 Tour de France victory parade, the Queen's Royal Visit, and Thoughts for Molly Meldrum.

DIS is dynamic, it is constantly changing depending on the users and their interaction with it. It reacts to the amount of input provided and encourages interaction and participation by displaying the comments that are sent to it. DIS promotes communication by exposing a question that is important to the context in which it is located.

- Static **Dynamic** **Reactive** **Interactive** **Participatory** **Communicative**
- Performative Controllable



Figure 11. Discussions in Space, FedSquare Melbourne.

Discussions in Space is an application that was designed for use on large media screens which have typically been retrofitted onto building façades. This is the first example we discuss where the design of the media and the architecture were not part of the original architectural design. Discussions in Space can be run on any digital screen, therefore, there is no direct correlation between its design and the design of the architecture or urban space in which it is applied and used.

The Cube is part of Queensland University of Technology's Science and Engineering Centre (Fig. 7). It is currently one of the largest digital and interactive learning and research spaces in the world promoting explorative and participatory experiences to the university community and the public. It is composed of more than 40 multi-touch screens and 14 high definition projectors (thecube.qut.edu.au). The content that is created for display on The Cube is mainly based on STEM (science, technology, engineering and maths) research and artistic practice. The Cube hosts a range of hands-on workshops for schools, provides residencies for artists and researchers, and a series of public events focused on engaging with the STEM disciplines of the university.



Figure 12. CubIT running on The Cube, Brisbane.

The purpose of The Cube is to engage with the learning of the STEM disciplines through an interactive and technologically based environment. The content on The Cube is designed to be highly dynamic and reactive to the user interaction and participation. Primarily, The Cube displays information or content, however, through one of the purpose-built applications called CubIT, registered users are able to display digital files on the interactive screens (Rittenbruch, 2014). Through its residencies and workshops, people can create content to be displayed on The Cube, however, it is not something that anyone can do at any time, therefore it is participatory only to a degree.

- Static **Dynamic** **Reactive** **Interactive** **Participatory** **Communicative**
- Performative Controllable

The Cube is situated within a designed for purpose part of the Science and Engineering Centre. The design and placement of The Cube is intentional for the purpose of direct interaction and engagement with students, staff, and the public.

Media Projections

The project **Night Lights** created by YesYesNo Interactive Projects in collaboration with The Church, Inside Out Productions, and Electric Canvas, focused on turning “*the Auckland Ferry Building into an interactive playground*” (yesyesno.com/night-lights). YesYesNo Interactive Projects is a media collective based in New York City who focus on creating interactive media and magical, creative, artistic, technological installations.



Figure 13. Night Lights. [yesyesno.com/night-lights]

The purpose of the installation was to go beyond projection onto the façade of a building by allowing participants to become performers through the amplification of their movement onto the building (Fig. 8). Phone, hand and body interaction were incorporated into the performance and amplification on the building (yesyesno.com/night-lights). This project sits highly on the interactivity scale as it allows users to become the creators of the content that is projected onto the building through their performance. Night Lights is dynamic, reactive, and interactive promoting participation and performance from its users. The media façade does not communicate any semantic information.

- Static
- Dynamic**
- Reactive**
- Interactive**
- Participatory**
- Communicative
- Performative**
- Controllable

Night Lights is an installation designed to be projected onto the existing façade of a building. In this case the media is not related to the design of the building.

Tangible Media Architecture Interfaces

The Smart Citizen Sentiment Dashboard is described by Behrens et al. as a Media Architecture Interface (MAI), “*the synthesis of situated ‘tangible user interfaces’ (TUIs) connected to media facades in urban space,*” (Behrens et al., 2014, p. 2). The dashboard was connected to the existing media façade of the FIESP building in São Paulo, Brazil, during a three week media arts festival in September 2013 (Fig. 9). The dashboard was situated across the street from the building and next to the transport entrance that allowed users the distance to see the full façade of the building. The dashboard employed RFID technology so users can interact with it using their transport RFID tags to indicate their mood and respond to issues regarding the use of technology in the city such as environment, transport, safety, public space, and housing (Behrens et al., 2014). The response from the users was then translated onto the media façade through animations including mood indicating colours and icons, for all else to see. Each response was aggregated to the existing responses indicating “*an overall ‘sentiment’ of the city towards its urban challenges*” (Behrens et al., 2014, p. 4).



Figure 14. Smart Citizen Sentiment Dashboard in São Paulo, Brasil. [N Valkanova, Flickr CC]

The Smart Citizen Sentiment Dashboard encourages users to participate in the communication of the sentiment of the city. The media façade becomes interactive through the dashboard. Without the use of the dashboard users do not have the ability to interact with or communicate through the façade.

- Static **Dynamic** **Reactive** **Interactive** **Participatory** **Communicative**
- Performative Controllable

The design of the tangible component of the Smart Citizen Sentiment Dashboard is in direct response to the engagement it intends to solicit from its users. The application that connects the dashboard with the building is retrofitted onto the existing media façade of the FIESP building. Previously, the façade did not allow interaction from users on the street.

The **SMSlingshot** is described by Fischer et al. as, “*a media façade system at the confluence of art, architecture, and technology design in the context of human computer interaction*” (Fischer et al., 2013, p. 38). The purpose of the SMSlingshot is to promote civic and social dialogue through a participatory approach. The SMSlingshot is a tangible device allowing users to type a text message that is ‘shot’ onto the media façade (Fig. 10). The process of shooting onto the screen is intended to “*evokes memories and feelings of childhood unruliness. This playful rebellion gives the slingshot a guerrilla-like quality, which fits with our overall vision of ‘reclaiming the screens’*” (Fischer et al., 2013, p. 40). The act of shooting is performed by the user creating a sense of control over the creation of content for the façade. Fischer et al. (2013) argue that the ability to shoot across a long distance onto a large media façade heightens the user experience by bridging the gap between architectural and human scales.



Figure 15. SMSlingshot at the Today'sArt Festival, The Hague, The Netherlands, 2011. [Haags Uitburo, Flickr CC]

The SMSlingshot provides the creation of a dynamic and responsive media façade that promotes participation and performance from the situated public as indicated on the interactivity scale.

Static **Dynamic** **Reactive** **Interactive** **Participatory** **Communicative**
 Performative Controllable

The SMSlingshot media façade system can be categorised as a Media Architecture Interface, as it, too, has been designed to act as the mediator between the participation of the city users and the media façade. This system can operate on either a digital screen or through projection, therefore, the design of the building is not in direct response to the media.

DIY Media Architecture

In this section, we first review examples of nascent DIY Media Architecture. What sets these examples apart from those examined in previous sections is that these were not developed as media arts projects or installations for a client, a festival, or dedicated media façade or screen, they are created from the bottom up. These examples are the result of a need to communicate to a large audience. The creators had big ideas and messages they wanted to share with the general public and found that the built environment provided the best medium to do so.

Second, we look at the building blocks of DIY Media Architecture and review a number of ‘kits,’ prototyping tools and platforms to enable others to use and reuse some of the resources that were originally being created for a specific Media Architecture project. Such tools and platforms not only enable a reuse and recycle approach to the artefacts and building blocks, but also a remix culture that encourages adoptions, adaptations, and appropriations in the spirit of open source and DIY.

Third, we tentatively and carefully propose a number of additional areas of investigation to help create some more robust design strategies to enable true DIY Media Architecture to flourish.

Examples

The following two examples involve projection onto the built environment. They can be described as guerrilla projection which is a tactic contributed by Corbin and Read in the guerrilla handbook, “Beautiful Trouble” (2012). Guerrilla projections are used by activists as a medium to broadcast and deliver a message. The benefits of this tactic are the temporary reach that projection provides, by allowing the message to be placed on the façade of a building or an area that is not physically accessible (Corbin & Read, 2012). This tactic is generally risk free and low cost while also visually appealing by casting light on the “opposition.” The projection can be mobile, malleable, and interactive in combination with online tools that supporters can tweet or SMS messages displayed in real time.

The **SMS Guerrilla Projector** (Fig. 11), created by Troika in London, 2005, is a homemade projection device allowing users to project SMS text messages in public spaces including streets, signs, onto people, and buildings (troika.uk.com/project/sms-guerilla-projector). Troika is the name for the art and design studio of three artists who work together: Cony Freyer, Eva Rucki, and Sebastien Noel. They are the authors of the book “Digital by Design.” As artists and designers, their work takes a creative approach to the use of technology to explore its impact, raise questions, and experiment with its potential (Freyer et al., 2008).

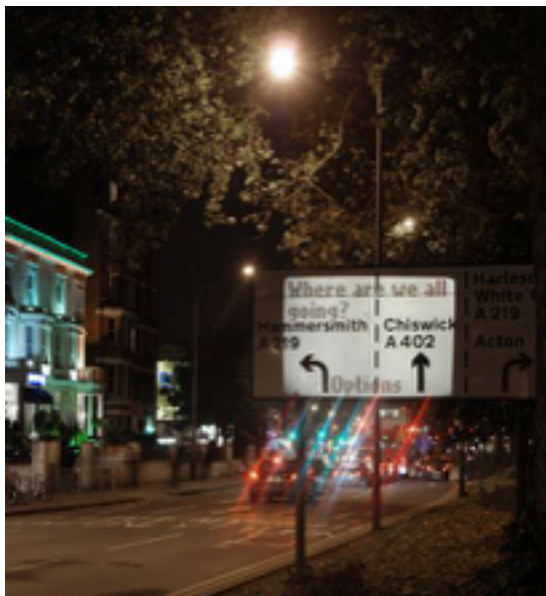


Figure 16a and b. Troika Projection and the Troika Projector [troika.uk.com/project/sms-guerilla-projector]

Mark Read created the **Bat Signal Project** (Fig. 13 & 14), as a part of the Occupy Wall Street Movement in 2011, which included large-scale guerrilla projections onto buildings in New York City (Jardin, 2011). The projection displayed the 99% image along with a series of quotes that were chanted by the tens of thousands of protestors walking across the Brooklyn Bridge with LED candles.



Figure 17. Bat Signal, NYC. [Joe Lustrì, Flickr CC]

The power of guerrilla projection is described by Corbin and Read: “Projections help us upend the power dynamic. The buildings of the powerful can feel so big and our voices and protest signs so small. But when a huge ‘99%’ bat signal lights up the sky, or you see your

own handwriting scrawled across a corporate HQ in real time, it begins to level the playing field. Small voices are writ large.” (Corbin & Read, 2012, p. 113).

The issue of scale is made clear by this statement where individuals often feel small in comparison to tall buildings that are representative of large organisations or corporations. By projecting onto a building façade, the size of the statement is in direct response to the size of the building and the size of the corporation. Although the activists may feel small in physical stature, the projection medium allows their voices to be largely visible to a greater portion of the audience and increasing the reach, size, and perhaps value of their message.



Figure 18. Guerrilla Projection, Occupy Wall St movement. Image Credit: Brennan Cavanaugh via Flickr CC

Understanding the basis for DIY and DIWO cultures is an important aspect to the development of DIY Media Architecture. Examples of DIY Media Architecture not only possess a ground up outcome, it is the process, the design, and development that entails a DIY approach and fundamentally seeks to provide a voice or communication means for the local community or the public at large.



Figure 19. 3D Print Canal House. [Andrew Sides, Flickr CC]

The **3D Print Canal House** (Fig. 15) is a form of DIY Media Architecture where 3D printing technology is being developed to print a canal house in Amsterdam as part of a collaborative research and building project connecting design, technology, science, and the community (3dprintcanalhouse.com).

The project intends to explore the benefits and challenges of 3D printing technology for the construction industry. One of the strengths of 3D printing is the ability to create customisable and detailed artefacts. The project aims to use sustainable materials to create low-impact housing solutions for any global location. The fundamental design, research and production of the 3D Print Canal House relies on the open sourcing of information, “*What makes the 3D Print Canal House special is that it is a project which is ‘open’ in every way: The initiators, designers and builders (DUS architects) are the client: the focus is on research, experimentation and development, instead of finishing a house*” (3dprintcanalhouse.com). Some of the components are made of translucent plastic and when experimented with different lighting options the building becomes an example of DIY Media Architecture.

Prototyping tools, kits, and platforms

Inspired by the success of the DIY, DIWO, and tinkering platforms that we briefly introduced above, such as Arduino, Raspberry Pi, and MakeyMakey, media architects have started to devise their own custom-made prototyping tools, kits, and platforms. Hoggenmüller and Wiethoff (2014), for example, presented *LightSet* as a way to enable urban prototyping of interactive media façades. Their work extends and integrates the *LightBox* previously discussed by Wiethoff and Blöckner (2010) as well as research by Korsgaard et al. (2012) on the *Odenplan*.

Tools and platforms such as these, are essential to enable more sophisticated, advanced and complex creations, an upscaling of situated media architecture design interventions, better collaborations, as well as to avoid reinventing the wheel. However, one of the key self-acknowledged issues with many such tools and platforms remains the expert level technical knowledge and know-how required in order to master them for both laypeople and novice media architects trying to become productive and create impact.

Working on improving both accessibility as well as usability of prototyping tools, kits, and platforms is currently a significant endeavour in media architecture, as can be seen by the diversity of workshops held at this year's Media Architecture Biennale with not less than four of them focussing on issues related to themes of prototyping and open source:

- Tools, Services and Building Blocks for Creating Media Architecture;
- Prototyping Interactions with Media Façades;
- Open Source Media Architecture;
- Fingies Toolbox for Media Architecture.

We believe it is useful to review and reflect on the experience in other domains and disciplines in order to leapfrog our own undertakings.

Strategies

We finally seek to tentatively propose a number of areas for further investigation in order for us as a community of practice to eventually come up with more robust design strategies and recommendations. This section is meant to stimulate and continue a broader discussion not only of what it means and what it takes to enable DIY Media Architecture, but also what impact it may have – both good and bad.

Mostly used in the context of community consultation in urban planning, the highest level in Arnstein's Ladder of Citizen Participation is 'citizen control' or 'empowerment' (1969). Similar taxonomies have been adopted by the *International Association for Public Participation* in their IAP2 Framework and Toolkit (iap2.org). We argue that enabling users, i.e., residents, citizens, people, of media architecture to not only 'use' – even in the most participatory manner – but also to become DIY designers and creators in their own right, may lead to citizen control. In order to foster design approaches and strategies that lead to citizen control, we propose five areas for further work and investigation. In our view, DIY Media Architecture requires:

- a. Transdisciplinary teams with expertise that covers social, spatial and technical research and design domains;
- b. Participatory approaches and methodologies – not just for the artefact at the end, but also the design process (e.g. Participatory Design, Participatory Action Research);
- c. Open source repositories of code and documentation;
- d. Creative commons licensing;
- e. Design strategies that allow for future tinkering, expansions, appropriations, and remixes, and for those DIY and DIWO activities to be documented, too, in a similar fashion to Brand's famous work in architecture itself (1997). Brand (1997) famously encouraged architects to embrace the fact that the designer's intent is not always identical with the way people use, perceive, or appropriate an artifact.

Conclusions

Learning from existing activist cultures and the DIY movements, the solution for media architecture in engaging with communities successfully will be in taking a meta-design approach. Designers in this field will have to use their expertise and professional knowledge to set up the opportunities and provide the tools for society to take control and combine media and architecture for their own purposes.

Schneider and Till argue that architects have the choice to be a spatial agent, “*one who effects change through the empowerment of others. Empowerment here stands for allowing others to ‘take control’ over their environment, for something that is participative without being opportunistic, for something that is pro-active instead of re-active*” (2009, p. 99). It is in this vein of pro-activity and open sourcing of information that we aspire for a higher level of application for media architecture, where the boundaries of HCI, interaction design, media, and architecture can be pushed and woven together to allow for DIY Media Architecture to continue to occur.

When considering how to promote DIY Media Architecture, we need to question how such interventions would be governed and how they would be designed? How can spaces and technologies be made available and open to the public so that they can create their own interventions? Do designers and property owners provide the framework and toolkits for DIY Media Architecture to be developed upon? What are novel components and platforms that are needed to create a DIY Media Architecture intervention?

One approach would be *plug & play*, as in the Ars Electronica Center, where a façade is ready for anyone to take control of the content by plugging in their smart device or computer. Another approach similar to the SMSlinghot, is to have a tangible device that acts as the mediator between the façade or projection and the public user. Could property owners and city councils allow façades and public spaces to be “checked out” like the process of borrowing books from a library?

We learn from the examples discussed in this paper that designing for interaction, appropriation, and communication, are critical aspects of DIY Media Architecture. The answers to the questions raised need to be considered from all parts of city makers including

planning authorities, councils, architects, designers, property owners, developers, and city inhabitants. A successful urban environment is one that elicits participation from its users, highlighting the powerful combination of media and architecture to provide a voice for the people that will continue to attract interaction in their own right.

As far as we can ascertain, there has not been any research to differentiate between successful community engagement from integrated architectural designs of media architecture versus retrofitted media onto existing architecture. This is an area which needs further investigation to understand the effectiveness of design in the implementation of media architecture.

2.3 Literature Review Summary

The literature reviewed in this chapter provides the theoretical framework that guides the decision making process throughout the rest of this thesis. Place theory highlights the value of the individual and their experience within public space. Acknowledging that different locations have different meanings and memories for different people shifts the focus from formal or aesthetic approaches to design to one that is more social and experience driven.

In terms of timeline and the order in which things occurred the first paper in this chapter was written within the first year of my PhD study in 2012. It highlights the exploration of place and its meaning from the different perspectives of architecture, urban informatics, human computer interaction, and interaction design. The proposition of hybrid place was an attempt to reconcile the fact that increasingly people experience digital and physical environments simultaneously through a range of technologies and devices. The case studies allowed for a closer examination as to how other designers and researchers were combining the digital and physical layers within their own practices. The cases reviewed in the paper are not large scale media architecture, particularly Shadowgram which is an interior installation. These examples were selected to focus on the experience people had within the space instead of how the media and architecture were coming together. The work coming from the Ars Electronica Futurelab, Shadowgram, resonated with me as it exemplified the coming together of different elements such as digital fabrication, design, and participation allowing for people to engage on civic matters in a creative and playful way. The concept of a ‘creative catalyst’ provided the theories and terminology necessary for me to express how I envisioned the interventions I was proposing for my own research.

For purposes of clarity and continuity the definition of Media Architecture which is utilised throughout this thesis has been defined by (Brynskov et al., 2013) as “*an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities,*” (p. 1-2). This definition forms the basis through which media architecture is understood and explored in the following sections.

Writing and presenting the second paper in this chapter (section 2.2) was a key turning point within the research as it provided a clear direction and strategies that heavily informed the design and implementation of design intervention #3 (Chapter 5). Exploring the DIY phenomena in terms of social, spatial and technical areas fit within the structure of the broad areas of people, place, and technology. It allowed the organisation of ideas and the ability to see how these different areas informed the development of the concept of DIY/DIWO media architecture. The main purpose of this paper was to create discourse around a media architecture that could be approached from the bottom-up, in other words individual or community driven regardless of disciplinary background or existing knowledge.

2.4 A Bigger Picture

Although the research presented in this thesis is strongly aligned with the areas of urban informatics and media architecture it is important to reflect on the contributions and ongoing work of other scholars who are similarly grappling with the effects that ubiquitous technology has on the experience of the city. These challenges are not new and have been a part of ongoing discourse.

William Mitchell (1996) foresaw buildings turning into large scale computer screens and digital facades. Movies such as Ridley Scott's (1982) *Blade Runner* depicted future cities that were set in 2019 with entire buildings covered in digital screens promoting advertisements. In 2000, Anthony Townsend began to question the impact that mobile telephones and access to information would have on urban environments and communication. In his paper, Townsend begins by proposing that, "Yet the cellular telephone, merely the first wave of an imminent invasion of portable digital communications tools to come, will undoubtedly lead to fundamental transformations in individuals' perceptions of self and the world, and consequently the way they collectively construct that world," (2000, pg. 1). He went on to argue that the large uptake of mobile phone usage across the globe and across different socio-economic regions was rewriting the spatial and temporal factors of all types of human communication. Townsend predicted that this surge of access to communication tools and

connection to information would decentralise decision making processes. “In parallel, this decentralization creates myriad new interactions and potential interactions between individuals that is dramatically speeding the metabolism of urban systems, increasing capacity and efficiency. The ‘real-time city’, in which system conditions can be monitored and reacted to instantaneously, has arrived,” (Townsend, 2000, pg. 5).

As Anthony Townsend predicted screens of all sizes are cluttering not only urban environments but nearly all aspects of daily life. As a result there are continued explorations as to what these technologies can offer people and the cities they live in. A major focus has been the smart cities movement which wikipedia defines as “A smart city is an urban development vision to integrate multiple information and communication technology (ICT) and Internet of Things (IoT) solutions in a secure fashion to manage a city's assets – the city's assets include, but are not limited to, local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services. The goal of building a smart city is to improve quality of life by using urban informatics and technology to improve the efficiency of services and meet residents' needs,” (Wikipedia, 2016). Industries, business entities, and many governments have welcomed the smart city vision with open arms and are collecting information and data about all facets of city organisations and infrastructures with the argument that this big data will help to make things more efficient. The smart cities initiatives have constant criticism mainly along three broad areas; 1. social sorting due to a mixture of location based services and digital signage (de Waal, 2013), 2. constant surveillance through data tracking devices and sensors, and 3. due to mobile screens people disengage with public life and resort to their “privatized tele-cocoons, bubbles or capsules” (de Waal, 2013). Townsend (2013) continues to question what this over reliance on technology really means to the individual and in the case that things should fail what does the future really look like? Townsend proposes that technology implemented by governments and businesses is not the answer to creating smart cities however it is how the technology is used by individuals for their own purposes where the real smart cities will be created (Townsend, 2013).

From another perspective Martijn de Waal (2014) examines the "city as an interface" where the city adapts and changes to suit the changing collective practice and values of social spatial protocols. The ways in which people relate to or interact with one another in public space is mediated through the different layers of physical and digital spaces. He uses the term urban media to broadly encompass the range of labels coming from different disciplines such as ubiquitous computing, locative media, ambient intelligence, internet of things, the sentient city and urban informatics. He claims that, "What all these urban media – a catchall term that I have used – have in common is that they no longer adhere to the anything-anytime-anywhere-new media paradigm of the 1990s. They are no longer conceived as creating an external reality called 'cyberspace', populated by people with 'nomadic identities' who congregate in 'virtual communities'. Rather, these technologies are centered on location-sensing capacities and aim to intervene in or add to a specific here- and-now, creating 'hybrid cities', whose experiences are constituted by both the physical surroundings as well as the mediated content that is brought into these physical situations by various technologies," (de Waal, 2014 pg. 9). As a result of de Waal's research he argues that such urban media has informed republican and libertarian ideals of what and how such technologies are designed and appropriated. In terms of libertarian ideals the technology informs the city as a market place. The republican ideals employ the technologies for the creation of public realms as a result of artistic or activist endeavours. The important aspect of this work is the emphasis on the hope for urban media to create a more democratic ideal where new types of public realms are achievable. These entail the novel formation of citizen organisation into urban publics which did not previously exist and cause a shift of power (de Waal, 2014) thus changing the ways people interact with each other and public space with hopes for these changes resulting in benefits for all.

Architects as Spatial Agents

Jennifer Gray (2014) discusses the work of the nineteenth century architect Dwight Perkins in Chicago who collaborated with social scientists and activists "to leverage design as a vehicle for social change". Jane Jacobs, the social activist who influenced urban studies, notes "Cities have the capability of providing something for everyone only because, and only when, they are created by everyone" (1962).

Two centuries later, architects and urban planners are still challenged by similar social dilemmas of rapid urban growth, social segregation, and access to information and how to respond as designers to these issues. Aligned with Jacob's viewpoints, Schneider and Till (2009) argue for architects to work as spatial agents. As the designers of buildings and contributors to the built environment, Schneider and Till suggest that architects need to face their social responsibility and realise the consequences of what they create and its influence on the urban environment. They state, “the agent is one who effects change through the empowerment of others. Empowerment here stands for allowing others to ‘take control’ over their environment, for something that is participative without being opportunistic, for something that is pro-active instead of re-active” (2009, pg. 99). How do architects act as spatial agents? Where do the opportunities exist for architects to facilitate and employ design as a way to express agency for the citizens of our cities? What role does technology and its different forms and facets provide as possibilities for architects to reconsider their future?

Similarly the discourse goes from the current views and the common misconception that technology usage through mobile phones, smart devices, and the creation of big data from sensoring and collecting every move we take will create more efficient and liveable cities. The underlying theme connecting the work of these different scholars is the focus back onto the human and highlighting that the technology itself is not the answer, it is how the technology is harnessed, adapted and appropriated by different actors to make their experiences of the cities they live in the best possible. The question remains how will architects, urban designers and urban planners continue to respond to this and create public spaces that enable or mediate technologies, materials, spaces and places that continue to connect people with one another which ultimately makes cities more vibrant and liveable.

Chapter 3: The Research Design

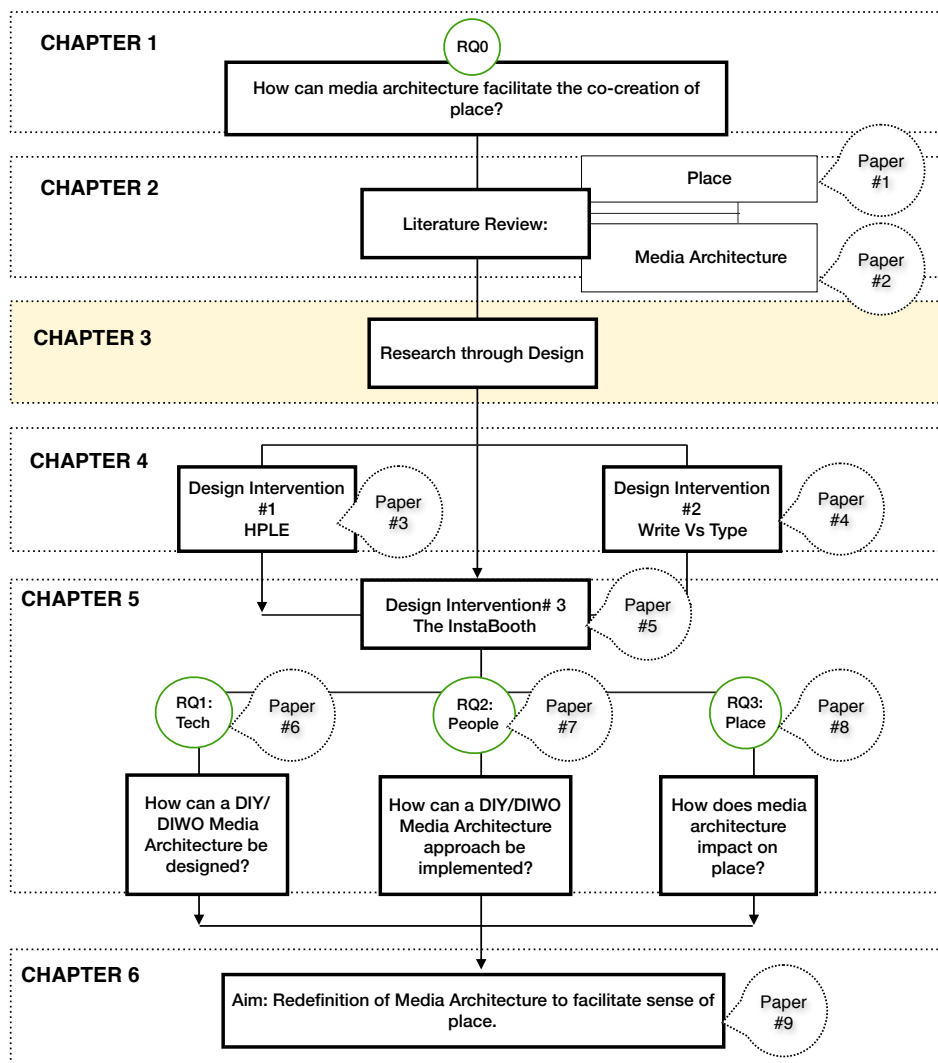


Figure 20. Way-finding Diagram of Chapters

3.1 Introduction

In this chapter the research questions are discussed. The *research methodology* considers the overarching theories which guides the scope of the study and the questions that are to be answered. To outline what data is required and the different ways the data is acquired the *research methods* section describes the details of how the data is collected and analysed, which is followed by a conclusion section that ties it all together.

Research Approach

The objective for this PhD is to combine architectural design, urban informatics, interactive media, and fabrication methods to construct and analyse opportunities for the co-creation of place in urban environments through media architecture. This focus is in response to my growing concern behind the ubiquitous nature of technology and how that is impacting the experience of public space and place. My concern being that people who have access to smart devices, such as mobile phones with internet access, tend to be distracted by what is occurring on their screen and not engaging with people and places in meaningful ways. Media architecture as an emerging discipline crosses the line between the tangible nature of architecture to the digital aspects of technology and media. It is from my constant struggle to grapple with what this means and looks like, that this research has arisen.

As a trained architect who fundamentally believes in the richness of an indeterminate process of design, the strategy taken in this research is iterative and non-linear. Each step forward builds upon the learning from the previous ones. Due to the complex nature of this study involving many parts, materials, locations, and collaborators, the research strategy which indicates a logic towards the answering of research questions (Blaikie, 2010; Crotty, 1998) is determined for this study to be abductive, deductive and inductive. An abductive approach begins by examining the construction of the social world of the people being examined, “their way of conceptualising and giving meaning to their social world,” (Blaikie, 2010, p.19). To discover the motivation and the meaning of the language and the accounts given by the people the researcher is required to enter the world of those being examined (Blaikie, 2010). The ontology of the research design describes the “nature of social reality,” (Blaikie, 2010, p. 92). The *Idealist* ontology recognises that the social reality is created by the representations and explanations that people create as they experience their everyday activities (Blaikie, 2010) which is what this research examines in order to answer the research questions.

Epistemological assumptions take into account the way and type of knowledge that is produced, and the criteria for acknowledging how much is enough and its quality (Blaikie, 2010). The epistemological assumption that describes this PhD research is *Constructionism*, the production of everyday knowledge as a result of people understanding and considering their interaction with society and the physical world (Blaikie, 2010). Cross (2001) discusses the work of Schön (1983) who provides a constructivist paradigm for design as a “*reflective*

practice”. It is through this reflective practice that designers construct new meanings and understandings through the effect and impact that the artefacts or systems they produce have on the world around them. In addition to this aspect of design, the theories of co-creation and participatory design inform each stage of this research process to different degrees where the knowledge is co-constructed with the intervention participants and research team. In order to explore people’s interaction with media architecture and the creation of place, a research through design (RtD) (Zimmerman et al., 2010; Gaver, 2012; Bardzell et al., 2016) approach guides this research. Dow, Ju, and Mackay (2013) describe research through design as “RtD emphasizes future possibilities and results in theory that can guide design practice and reveal insights about people, culture or interactions,” (pg. 19). This PhD combines visual and qualitative methods, to describe, evaluate and assess the research. Three design interventions form the basis of the research were deployed around South East Queensland between 2012-2015. The design interventions (DI#s 1-3) that are explained in more detail in chapters 4 and 5, relied on the contributions, interaction and engagement of participants.

Research Questions

To determine the factors that influence how people interact with different media and the impact of their experience with media architecture the research questions are aligned to the areas of design and technology, people, and place as seen in Figure 19 and are described in the following section.

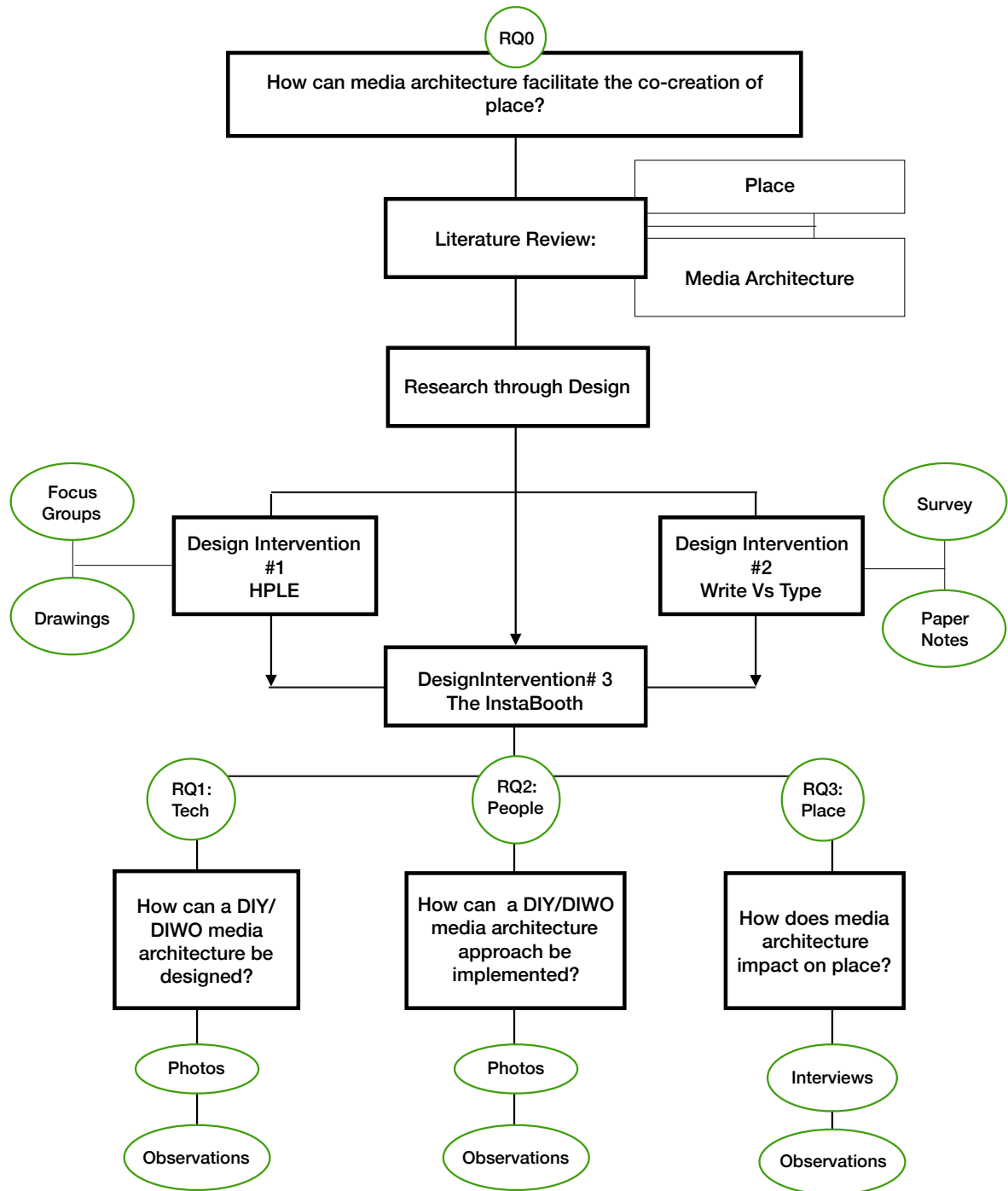


Figure 21. Diagram Indicating the Research Questions

RQ0: How can Media Architecture facilitate the co-creation of place?

RQ0 is the overarching question of this PhD research with the main aim being to uncover in what ways media architecture can be a meaningful mechanism to assist in creating place with local users. This question is further divided into a subset of three questions, which are specifically addressed through the design, deployment and evaluation of design intervention #3, the InstaBooth in Chapter 5.

RQ1: How can a DIY/DIWO Media Architecture be designed?

This research question focuses on the design process and technologies used to create a DIY/DIWO media architecture prototype, the InstaBooth (Chapter 5.2). It explores the collaboration between architectural designers, interior designers, urban informatics, interactive and visual designers, computer scientists and community members. In responding to this question it was critical to examine the participatory and co-design fundamentals of the DIY/DIWO prototype to highlight the benefits and challenges of the design process. Observations and photographs documented the design and fabrication of the prototype, which involved a series of design workshops and the creation of scaled models that incorporated a range of digital fabrication technologies including laser cutting, and CNC routing.

RQ2: How can a DIY/DIWO Media Architecture approach be implemented?

This research question promotes the testing of the theories behind the DIY/DIWO media architecture concept to provide reflection and insights into how such a prototype can be successfully deployed in public urban spaces. The concept of DIY/DIWO media architecture was developed within this PhD and as a contribution to the discipline of media architecture where addressing this question required analysing and reflecting upon the InstaBooth's eight deployments around Brisbane and Pomona, a small town in South East Queensland which occurred over an intense period of April - November 2015. The observations conducted and

interactions from the different people who engaged with the InstaBooth are the focus of this part of the research and response to the question is discussed in chapter 5.3.

RQ3: *How does media architecture impact on place?*

This question focuses on understanding what engaging with a media architecture prototype means to the people who interacted with it as addressed in chapter 5.4. Semi-structured interviews with participants from two deployments, the Brisbane Writers Festival and Pomona, are examined in depth to provide further understanding of the InstaBooth's impact on place. The implications of how and why users interact with digital and tangible media in urban spaces assists to inform the future development and design of media architecture for community engagement.

3.2 Methodology: Research through Design

Media architecture and urban informatics are intrinsically trans-disciplinary areas of design and research, which attempt to create and understand “the city as an ecology that consists of technological, social and architectural layers,” (Foth et al., 2011). This research examines the three broad areas of design and technology, people, and place and explores the domains of media architecture, urban informatics, and interaction design. Theories from these different areas are brought together and explored employing a *research through design* (RtD) approach (Dow, Ju & Mackay, 2013).

Rittel and Weber (1973) acknowledge the challenges of creative approaches to research by having identified and defined two models of addressing research problems; tame problems and wicked problems. Tame problems are aligned with traditional scientific approaches that require linear and orderly processes to address and resolve (Rittel & Weber, 1973). Tame problems are characterised by the phases of gathering data, formulating a solution and implementing the solution. Rittel and Weber proposed that design belonged to the wicked problems type of research, which is identified as an opportunity driven way to solving problems (1973). Design problems are typically concerned with social and cultural issues

differing to the scientific qualities of tame problems (Rittel & Weber, 1973). Architect and researcher, Mark Burry has identified that wicked problems typically create new problems and their resolution does not provide black and white answers (2008) therefore often require and adopt different methods to problem solving. Wicked problems are indeterminate in nature which is inherently similar to the architectural design process adopted by many practitioners. *Research through design* has been defined by Zimmerman et al. (2010) as “a research approach that employs methods and processes from design practice as a legitimate method of inquiry” (pg. 310). The research through design approach has also been linked to wicked problems (Zimmerman et al., 2007) and is well suited to architectural research as a way of producing knowledge through inquiring. The purpose of research through design is to develop and implement designed artefacts with the intention to learn about particular facets of human experience (Dow, Ju & Mackay, 2013; Frayling, 1993) and to create theory (Dow, Ju & Mackay, 2013; Zimmerman et al., 2007; Zimmerman et al., 2010).

In the interaction design and HCI research communities there is ongoing discussion regarding RtD as an emerging method in these fields with growing attraction and use due to the inherent nature of design to be collaborative and multi or trans disciplinary (Zimmerman et al., 2010). As a result critiques of RtD concern its lack of formalisation, lack of rigor and discourse (Gaver, 2012; Zimmerman et al., 2010; Zimmerman et al., 2007). Dow, Ju and Mackay (2013) provide further discussion around RtD to strengthen its position as a legitimate and valuable approach to conducting design based research. They propose a framework based on projection, place and point of view as key considerations for researchers planning to undertake research through design approaches (Dow, Ju & Mackay, 2013). Further recommendations have been presented to formalise RtD (Gaver, 2012; Bardzell et al., 2016) acknowledging that it provides certain advantages such as; allowing researchers to address messy situations through design, shifts the focus from research on the past or present to research on the future, the ability for researchers to actively inform the state of the world that they desire (Zimmerman et al., 2010). Although this methodology tends to focus on the outcome of a physical artefact or system, more researchers are extending the approach to create societal change for improving society with views towards the future (Zimmerman et al., 2010; Gaver et al., 1999; Swann, 2002; Zimmerman et al., 2007). It is in line with this thinking where the intention of this PhD research is to: explore the future through design

interventions, to generate insight about place, to propose media architecture that can help people and communities be empowered and make change.

The design process of different design interventions throughout the study has allowed for the interrogation of the meaning of place through different mediums. These were used to envision the future and question the co-creation of place. This PhD research ultimately attempts to address the wicked problems of combining architectural design with different media and their social impact. This combination attempts to promote interaction and engagement from situated users. It is used to explore the creation of place and understand what that means to the people and their community. Therefore a research through design approach was most suitable as it allowed for iteration and exploration of different methods to occur guided by a designerly way of knowing and thinking (Cross, 2001; Cross, 1999; Cross, 1982). This concept refers to a designer's knowledge "about the artificial world and how to contribute to the creation and maintenance of that world" (Cross, 2001 pg. 4).

Employing a constructivist approach the research is structured in different phases, each one building on the previous ones. The literature and case studies reviewed in chapter 2 provide the basis from which the DIY/DIWO media architecture concept (Chapter 2.2) was produced through an abductive process. The DIY/DIWO media architecture concept was then tested using a deductive approach through a design methodology, articulated in two main parts; the design process of the interventions and the exploration of qualitative data to understand what the interventions meant to the participants. The design aspects of the interventions were informed by participatory and co-design processes. The research was conducted in three phases (design interventions #1, 2, 3) with four distinct cycles; design of the interventions (#1, 2, 3), implementation of the interventions, data collection, and data analysis. Each design intervention was context specific therefore required a combination of research strategies that responded to the situation examined.

To add rigor to this RtD approach it was necessary to borrow from existing social science methodologies, such as participatory action research. The data was collected and analyzed using a mixture of qualitative, visual, and thematic analysis methods as indicated in Figure 20. To examine the design and implementation of design intervention #3, the InstaBooth (Chapter 5.1-5.3) the inductive approach began by collecting data and information from

which understanding and descriptions of the characteristics of social life were derived (Blaikie, 2010). Through induction of the drawings (chapter 4.1), notes (chapter 4.2), and interview data (5.4) collected insights have been obtained about different aspects of media architecture and its relationship to place.

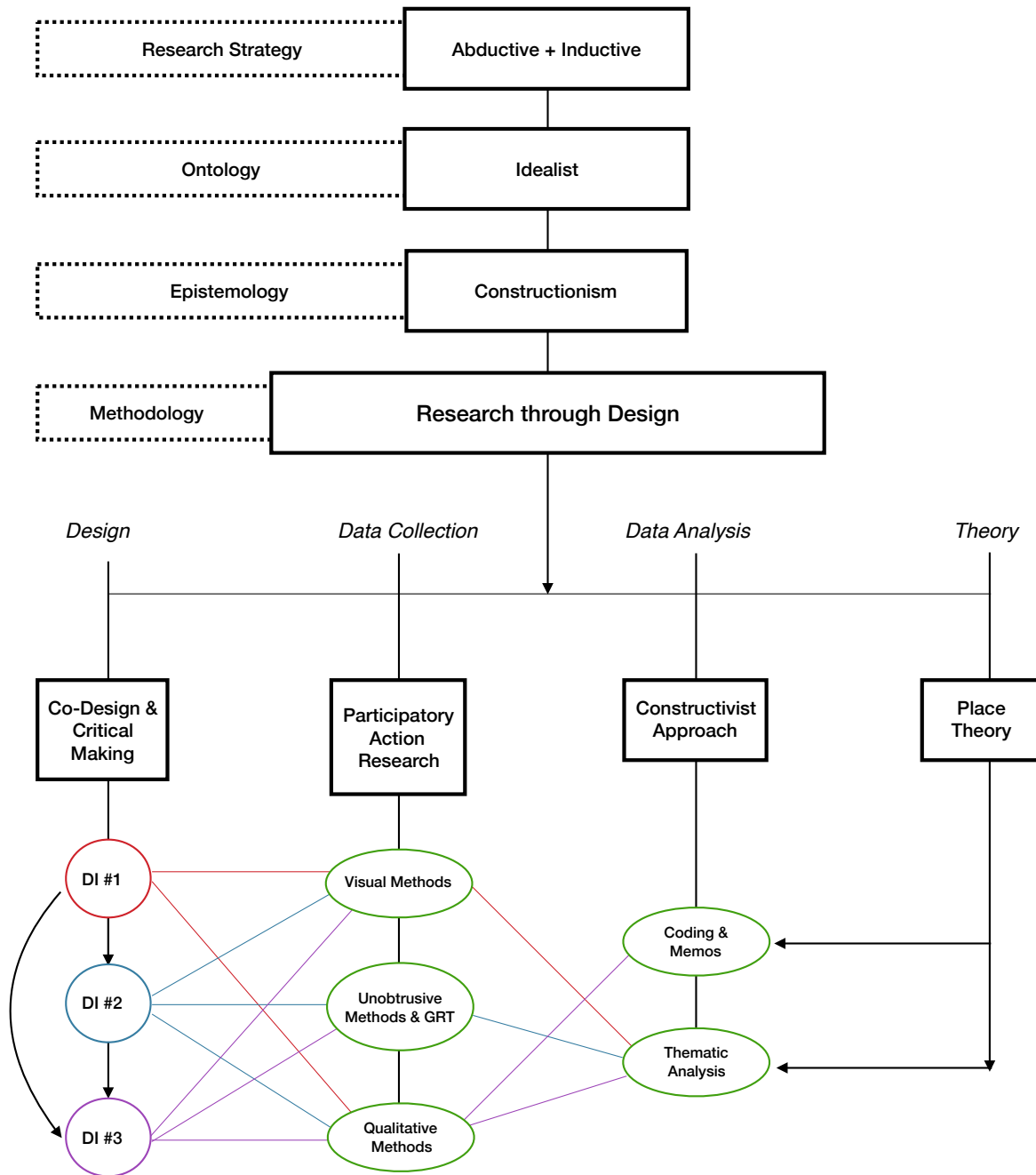


Figure 22. The Research Design

The following sections describe the two main parts of this research, the design process and the qualitative data collection, and the methods that were used.

The Design Process: Participatory and Co-design

Acknowledged by Fischer and Gjaccardi (2006) *Meta-design* is a system that shifts the focal point of designing a complete product to allowing for creativity to emerge from the lessons that are learned from making mistakes and iteration. The creative process generates novel perspectives, the creation of new knowledge and deeper understanding (Fischer et al., 2005). Each of the design interventions employed a creative design process to implement them however the most important aspect of each one is how they inspired creativity to emerge from their participants. It was through their creativity that the individuals were able to reach a deeper understanding of place.

Steen argues that the intention of participatory design is to accommodate users of a design a role in the design process, testing, and deployment of objects, systems or processes (Steen, 2011). Originating from the Scandinavian research around designing computer systems and work environments, participatory design theories (Bodker & Pekkola, 2010; Muller, 2003; Muller & Kuhn, 1993) have progressed toward a more recent trend of co-design (Sanders & Stappers, 2008). The extent and type of participation is the determining factor that distinguishes between participatory and co-design. Participatory design involves direct input in the design process from end users where co-design is a collaborative approach to design that involves specific stakeholders. Introduced by researchers at the University of Toronto, *Critical Making* (Ratto, 2011; Ratto et al., 2011; Ratto & Hockema, 2009; Ratto & Ree, 2012) is a method that combines participatory design with a hands on approach to making physical artefacts by implementing digital technologies. This process acts as “cultural probes” (Gaver et al., 1999) to assist in creating dialogue around the perceptions and connections people have with digital technologies such as digital fabrication tools and devices. Workshops and sessions focus on the making while promoting dialogues to occur reflecting on the process and use of technology (Ratto & Ree, 2012).

The design interventions occurred in two distinct phases; the pilot studies (DI #1 chapter 4.1 & DI #2 chapter 4.2) and the principle study (DI #3 chapter 5). Although each design

intervention is different from the others, the results and findings informed the development of the next. Collectively the findings from the pilot studies informed the design, deployment, and evaluation of design intervention #3. The success of the interventions were evaluated based on Harrison and Dourish's (1996) key factors for the creation of place; *participation*, *adaptation*, and *appropriation*. The design interventions were situated in different public spaces or "in the field" (Dow, Ju & Mackay, 2013) around Brisbane and Pomona where the engagement of the public community was encouraged and recorded. Ultimately the design interventions served as a means to attract the engagement of a range of people from each location to continue to inform and build the research. The involvement of users varied between the different design interventions and their contexts, this is discussed in detail in sections 4.1, 4.2, and 5.2. A brief summary for each intervention is provided here to clarify the level of involvement of participants in each part of the study.

Design intervention #1 (participatory design), was conducted with two separate groups of people, as discussed in section 4.1. Through the intervention participants were asked to draw their experience of place by mapping the locations where they work, play, and learn as a way to explore the design problem around the lack of communication of people's personal learning environments. The outcome was not the design of an artifact or a system however it was the creative process which involved the participants in the analysis of their own drawings through a series of questions and focus groups. By asking the participants to draw their places and through the reflective practice of creating the drawings a level of creativity was fostered allowing the participants to assist in identifying a starting point for future design development. It was in this way that the intervention was considered to employ participatory design (Sanders et al., 2010) as a method.

Design intervention #2 (co-creation), was designed and deployed with colleagues Leonardo Parra-Agudelo and Ronald Schroeter. In partnership with two different public events, this intervention asked users to respond to questions about place either through writing notes or sending tweets or texts to two different urban interfaces (a cardboard structure or a digital screen). The responses provided by the users remained visible to others and became the content displayed. Therefore the users co-created the media content of the interfaces. The

analysis of the data did not involve participants, it was done by the research team, details and findings are in chapter 4.2.

Design intervention #3 (co-design & co-creation), learning from the interaction design and HCI fields, a meta-design strategy that combines participatory design (Steen, 2011), co-design (Sanders & Stappers, 2008), and critical making (Ratto, 2011) theories was employed in the design process and research approach of the InstaBooth which was deployed in South East Queensland.

Sanders and Stappers define co-design as, “the creativity of designers and people not trained in design working together in the design development process.” (2008 pg. 6). Based on this understanding of co-design section 5.2 particularly discusses the design process of design intervention #3, the InstaBooth, highlighting the benefits and challenges of employing a co-design approach to communicate across design disciplines and stakeholders who were non-designers. The InstaBooth was a much larger design intervention in scale and scope than the previous ones. Therefore the InstaBooth project went through several phases of design iteration which involved stakeholder participants in co-design workshops involving critical making approaches to focus on the design of the structure and the interactive components within it.

Once the InstaBooth was deployed in public spaces and questions were asked of the public, their responses either through digital or tangible media became the content within it. Sanders and Stappers refer to co-creation as, “any act of collective creativity, i.e. creativity that is shared by two or more people. Co-creation is a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual, as can be seen by the output of search engines,” (2008 pg. 6). Within the InstaBooth users were able to interact and engage with the content created by others, they were able to adapt, and appropriate the interactions and content, and reflect on the creative process of doing so, therefore in line with Sanders and Stappers (2008) we argue that the content was co-created by its users.

Action Research and PAR

In the *Reflective Practitioner* (1983), Schön discusses how practitioners of design reflect “in action” and “on action” during their work. This process of identifying a problem, examining the situation and context, and exploring possible solutions link the design process with action research methodology (Swann, 2002) from the social sciences. Action research involves four key aspects; plan, act, observe, reflect (Swann, 2002; Kolb, 1984; Carr & Kemmis, 1983). This process may lead to the identification of more questions causing the cycle to iterate and as Swann (2002) indicates is very close to the iterative cycles of design processes. This proximity allows for a natural progression from design to research through design providing this emerging approach some stability and structure from the more established social science methodology of action research.

Building on action research, Sara Kindon et al. (2008) describes the methodology of participatory action research (PAR) as the collaboration of researchers and participants in examining a problem or situation together. The aim of PAR is to empower ordinary people in and through the research creating a socially owned process of research (Kindon et al., 2008). Based on action research, PAR is cyclical and context specific. The methods used within PAR may include traditional social science methods of semi-structured interviews, focus groups, or it may also involve a range of innovative research methods such as video, performances, drawing, or diagramming (Kindon et al., 2008). The flexible and open methods within PAR reflect the notion of research that is dedicated to the needs and issues related to the participants. Kindon et al. (2008) discuss the importance of space and place within participation as a political practice. PAR approaches tend to address local concerns and agendas regarding immediate social and natural environments in which they are located and particularly ground up processes, which indicates that this methodology is appropriate for place based research (Foth & Brynskov, 2016). The difference between Action Research and Participatory Action research is that PAR relies on the politics of the research process and action research does not depend on the involvement of participants to engage directly within the research process (Kindon et al., 2008). Fundamentally PAR focuses on the action required to create change in order to address the political issue or problem of the participants.

The design interventions (DI #1-3) were intended to act as “Creative Catalysts” (Ogawa et al., 2012, p.58), to promote a collective creativity experience for participants through the

processes of drawing, writing, and making while questioning the experience and definition of place. Similar to the work of Lentini and Decortis (2010) the aim of the interventions was to promote the face-to-face interaction of people through the use of tangible and digital media in public spaces, aiming to combine the digital and physical layers of the urban environment. The involvement of users through creative collective and face-to-face interactions involving media architecture aspired to provide memorable experiences and elicit the creation of place.

In order to examine the overarching question of this research (RQ0), how media architecture can facilitate the co-creation of place, the design interventions were developed and deployed. Due to the social nature of this research, which focused on the experience of people, it was essential to promote their engagement and participation in the creation of place. A limitation of PAR is that it does not focus enough on the design aspects of research. Therefore it is the combination of research through design and the PAR methodology that guided the different methods used to create and examine what the interventions meant to the people who used and interacted with them. The interventions were situated in the location of question and invited the participation of interested communities to reflect on their experience of place. This was done by involving a range of tangible and digital media such as; the writing of notes on paper or through text messages and tweets, the drawing or sharing of pictures.

3.3 Methods

Building upon the case study by Lentini and Decortis (2010), similar research methods within this PhD were used to collect data around user involvement and their meaning in the design interventions. These methods include participant observation, interviews, focus groups, and thematic identification of transcribed interviews. Lentini and Decortis (2010) established a framework for determining the potential for technological devices to support experiences of place, of particular interest to this study was; to encourage the physical exploration of the environment, enable the discovery of the environment through the senses, empower the users, promote face-to-face interactions and “favour rich collective experiences between users,” (Lentini & Decortis, 2010, p.414).

Guerrilla Research Tactics

Typical social research includes the examination of information gathered from people either through talking or writing to them (Kellehear, 1993). Other social science methods that do not interfere or disrupt the social environment by talking to people are known as '*unobtrusive methods*' (Kellehear, 1993). These methods include the examination of written or audio-visual records, the use and wear and tear of physical objects, and simple observations (Kellehear, 1993). Kellehear (1993) discusses the advantages of unobtrusive methods within research to be the study of actual human behaviour, it is easily accessible, has low cost, and is non disruptive. Together with colleagues, Lindy Osborne and Inger Mewburn, we developed and wrote about Guerrilla Research Tactics (GRT), as a creative and unexpected approach to engaging research participants through situated interventions (Caldwell et al., 2015; Caldwell et al., 2016). A form of participatory action research and an unobtrusive research method, GRT is an alternative research practice that combines tangible and digital tools with urban informatics for gathering data (Caldwell et al., 2015; Caldwell et al., 2016). Although the interventions themselves disrupt the space, the interactions of users with the interventions are not disrupted by the researchers. The GRT focus is on minimising the need for researchers to talk to participants. Information is gathered from people through their interaction with physical artefacts, design interventions, or online tools which ask people to respond to a question or contribute to a discussion. The design and strength of GRT is the reduction of the impact from the researcher on how people provide their true thoughts. GRT promotes interaction from participants by focusing on common issues that provoke action from its stakeholders (Caldwell et al., 2015; Caldwell et al., 2016). Design intervention #2 is considered to be a version of a guerrilla research tactic discussed in section 4.2. The InstaBooth, design intervention #3 discussed in chapter 5, also has guerrilla research tactic characteristics as it acquires data without the need for researchers to assist or intrude in the data collection process. A range of different types of data were collected across the studies, as discussed in next sections.

Data Collection

Visual Contribution

The design of this research enables the combining of different methods depending on the context of the situation, people involved and place in question. The purpose of the design interventions was to use and augment traditional qualitative research to promote the collection of information from participants. This included the use of visual methods (Rose, 2014) such as drawings they make, notes they leave behind, or objects they create to examine place. Each design intervention asked participants to respond to particular questions through the making of drawings or written notes. The drawings and notes have been collected and have become part of the data sets for each of the design interventions. The purpose for encouraging participants to contribute through visual methods was intentional to help inspire a sense of creativity or playfulness but also to allow for participation from people who may not typically respond to traditional research approaches such as surveys. The drawings and notes also provide a way for people to communicate through other means regardless of their ability to read or write, different language use, or access to technology.

In design intervention #1 (discussed in chapter 4.1) the drawings that participants created was the primary data set. Participants in the study used the drawings to display their everyday places of working, playing, and learning. The drawings became the focus of the discussions with participants during focus groups.

Design intervention #2 (discussed in chapter 4.2) collected handwritten notes created by users. The notes were compared to messages that were tweeted and texted. The process of hand writing allowed participants more flexibility in expressing themselves. Some participants drew pictures, used different font types or colored ink to emphasis parts of their messages. These capabilities were not possible through texting or tweeting.

Upon analysis and reflection, the visual data collected through design intervention #3 (chapter 5) responded to the questions provided by stakeholders. The drawings and written notes were a valuable aspect of the intervention in instilling different levels of expression and creativity from participants. However, the content of these data sets did not address my research questions and did not provide the personal accounts from participants as to what the intervention meant to them. Therefore the data sets had to be supplemented with interviews which became the focus for the analysis of design intervention #3.

Verbal Accounts

The design interventions employed qualitative methods such as semi-structured interviews or focus groups to acquire deeper insight into the motivation for participation or to obtain information regarding the meaning of place from users.

Hennink and Leavy (2014) describe a focus group as a facilitated discussion which is focused on a specific topic with a small group (approx. 6-10) of people. The aim of the discussions is to expose perspectives and a variety of experiences from the different people involved (Hennink & Leavy, 2014). A focus group was conducted with design intervention #1 (chapter 4.1) which allowed two different groups of participants the opportunity to share their insights and different perspectives about the drawing process revealing their places related to work, play and learning. The focus group worked well in that study particularly because the groups knew each other fairly well and felt comfortable discussing certain aspects of their lives with each other. Because design interventions #2 and #3 were conducted in public urban spaces focus groups were not appropriate methods of collecting qualitative data for those studies.

Galletta and Cross (2013) claim that, “Semi-structured interviews incorporate both open-ended and more theoretically driven questions, eliciting data grounded in the experience of the participant as well as data guided by existing constructs in the particular discipline within which one is conducting research,” (pg. 45). For design intervention #3 (chapter 5) it was found that the best way to engage with users was one-on-one directly after participants engaged with the intervention. Using semi-structured interviews allowed for open-ended responses and the ability to inquire further on certain topics that arose. The semi-structured interviews ranged in length from 5-25 minutes.

Data Analysis

In design intervention #1 the collection of data occurred using a combination of visual (the creation of drawings) and qualitative methods (focus groups). Design intervention #2, a guerrilla research tactic, provided for observations, a short questionnaire, and the collection of written notes, tweets, and texts. For design intervention #3, the data was collected in the

forms of interviews, photographs, videos, observations, created artefacts including drawings and written notes.

Due to the large volume of data collected through design intervention #3, the InstaBooth, the focus within this thesis remained on the transcribed interview data which was found to be the best account of personal experience of the user. Learning from constructivist grounded theory (Charmaz, 2014; Glaser & Strauss, 2009) where the theory emerges from the data collected, a constructivist approach was applied to the analysis of the InstaBooth interview data. To obtain a close understanding of the interview data, they were transcribed and coded using NVivo which is a qualitative data analysis software. Kathy Charmaz (2014) defines coding as “categorizing segments of data with a short name that simultaneously summarizes and accounts for each pieces of data. Your codes show how you select, separate, and sort data to begin an analytic accounting of them” (pg. 43). Line-by-line coding, which is the coding of each line of transcribed data (Charmaz, 2014) was conducted initially. This process allowing for an in-depth review of the data, while keeping close to it and remaining open to surprises and nuance. The coding was conducted in parallel with the creation of memos to capture the development of ideas and reflections about the coding (Charmaz, 2014). The memos helped to analyse and make connections between the data. This process informed the development of broader codes followed by thematic analysis.

Thematic analysis was used to identify emerging patterns of reoccurring themes (Braun & Clarke, 2006; Vaismoradi et al., 2013; Creswell, 2013) within the qualitative data that was collected through the focus groups and semi-structured interviews. Braun and Clarke (2006) outline an inductive approach to thematic analysis following the process of 1. familiarisation with the data, 2. initial coding, 3. searching for themes, 4. reviewing themes, 5. defining themes, 6. reporting findings. This process was utilised in each part of the different studies and the results were written up independently in the different publications associated with the different design interventions (see sections 4.1, 4.2 and 5.4). The theories and case studies reviewed in the literature review, particularly place theory, guided the thematic analysis of the data collected.

3.4 Conclusions

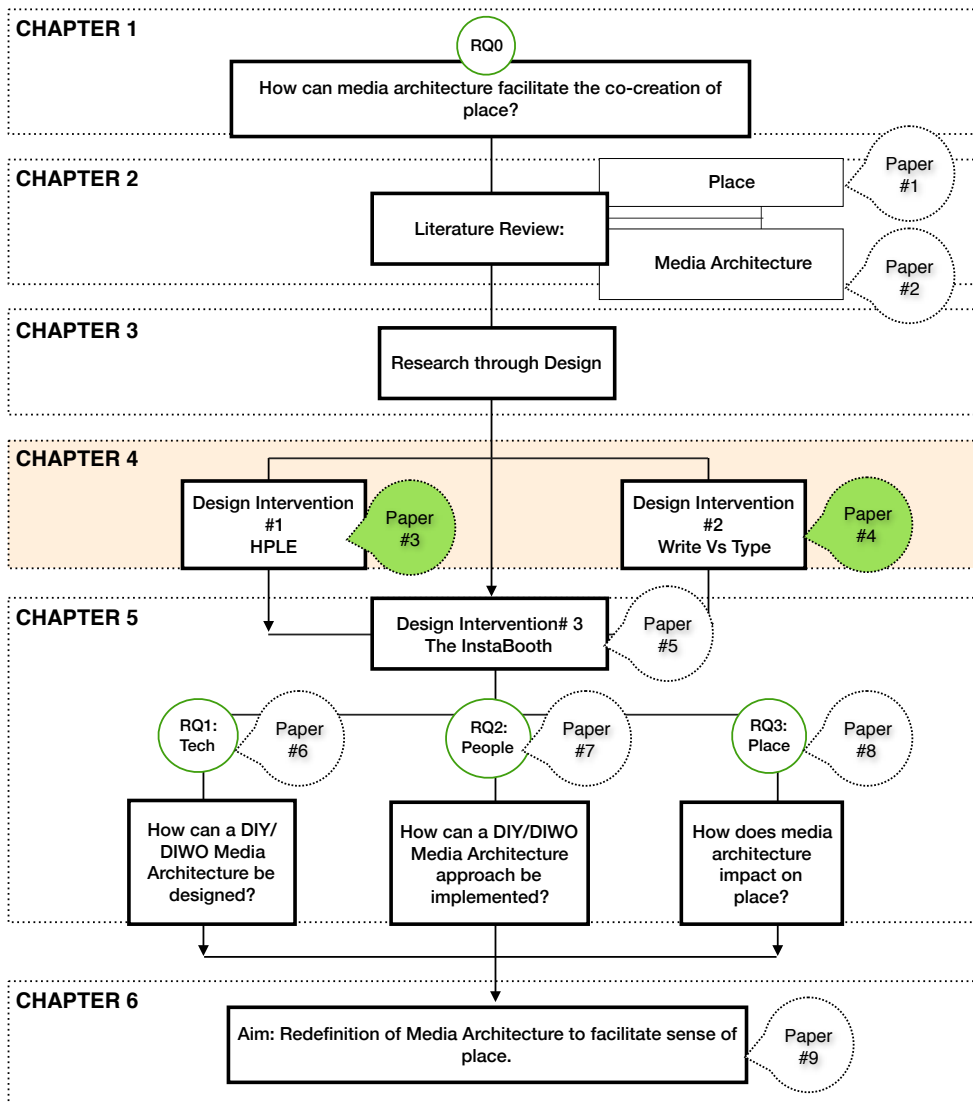
This chapter discusses a research through design approach that involved the design, implementation, and analysis of three different design interventions (DI#1-3) that occurred in Brisbane and Pomona, Queensland. As discussed previously the research through design methodology is still emerging and has little formalized structure (Gaver, 2012; Zimmerman et al., 2010; Zimmerman et al., 2007), which is inherent to addressing wicked problems and any indeterminate design process. The development of this PhD was highly dependent on the development of each design intervention and they informed the proceeding ones. The process was not straightforward, each intervention involved its own cycle of questioning, iteration, and reflection. The different interventions involved the collaboration with researchers from other disciplines, different stakeholders, community groups, and participants adding to its complexity. Their contributions were fundamental to each stage of the research not only informing the design and data that was collected but also the approaches and methods that were used to draw out findings and conclusions.

Research within the architecture discipline is informed by the sciences and social science and to this date does not have a discipline specific methodology for conducting research. Therefore research through design provides an approach to conducting research that is open to different theories from disciplines which are employing design as a process to examine the creation of artefacts or systems. RtD explores expression and creativity that emerges from that process. Through reflection and action new knowledge and theories can be established. Research through design is a holistic approach which explores the design process, the object, and its impact on the end users. Dialogue around research through design is currently driven from the HCI and interaction design research communities however there is opportunity from all the design disciplines to contribute to the ongoing development of this type of inquiry and practice. As Fischer et al. (2013) state, the architecture discipline can provide input by including a perspective that views the world through a range of scales i.e. global, city and urban, building, public spaces, and interior spaces while combining technology, materials, and human experience. This thesis contributes to the discourse promoting the value and impact that research through design provides by empowering people through creative practices to reflect on the meaning of place. These methods and approaches are not novel but

assist to inspire participants to view the world around them in a different way, to reflect and potentially create change within their local environments or communities.

The design interventions are situated and context specific therefore the methods used to collect data varied depending on the location of deployment and the stakeholders or participants involved in the process. The following chapters include the papers that were written to summarise the different design interventions discussing in detail the methods and findings from each part of the research.

Chapter 4: Design Interventions #1 & #2 Figure 23.



Way-finding Diagram of Chapters

In this chapter the first two design interventions are presented in two distinct published papers as indicated in Figure 23. These design interventions were conducted at early points within the candidature. Although they are relatively short in their scale and scope they provided critical insight into the third design intervention. Each one of the studies presented here dealt with different researchers, were deployed in different contexts, and used different methods. This variety can be seen as a weakness however the ability to test different ideas and approaches at early stages of the PhD was invaluable to the future work.

4.1 Towards Visualising People’s Ecology of Hybrid Personal Learning Environments

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student’s thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 4.1:

Caldwell, Glenda, Bilandzic, Mark, & Foth, Marcus (2012). Towards visualising people’s ecology of hybrid personal learning environments. In Brynskov, Martin (Ed.) *Proceedings of the Media Architecture Biennale 2012*, Association for Computing Machinery (ACM), Aarhus, Denmark, pp. 13-22.

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDA CALDWELL SIGNATURE DATE	Significant contribution to the planning of the paper, literature review, conducting the study, evaluating the data, and assisted with the preparation and evaluation of the manuscript. 18 July 2016
MARK BILANDZIC SIGNATURE DATE	Significant contribution to the planning of the paper, literature review, conducting the study, evaluating the data, and assisted with the preparation and evaluation of the manuscript. 18 July 2016
MARCUS FOTH SIGNATURE DATE	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript. 18 July 2016

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

Although I was the lead author of this paper the contributions of the co-author, Mark Bilandzic also a PhD student at the time, was extensive. We collaborated on every aspect of the paper including the brainstorming, the content, conducting the design intervention, data analysis and the writing. Prof Foth, contributed to the brainstorming, structure, editing of the paper, and presented it at the Media Architecture Biennale, 2012. Mark and I shared many common interests surrounding the combination of media and architecture within learning environments however we came from the different disciplinary backgrounds of architecture and computer science which provided a rich outcome and approach to investigating the problem.

Preamble

This study presents a design intervention that asks people to reflect on their personal learning environments. The participants reveal personal places, activities, and social networks where they work (being productive, being creative), play (having fun, socialising, enjoying, being entertained) or learn (being inspired, acquiring or modifying knowledge and skills).

This initial design intervention was an excellent way to learn about the places the participants experience in their everyday lives. The drawings that they produced acted as windows into their worlds. The main findings from this study that was carried forward was not only in how to deploy the intervention but that the drawings the participants created were informative on multiple levels revealing the following:

- people experience place in different ways
- people construct their own ecology of places within urban environments that mean something to them
- people use a range of drawing methods to communicate their ideas and thoughts
- people use spaces in their own way
- places people value involve social interaction, productivity and fun.

These results informed the design of the interventions 2 and 3 that invited users to co-create the content and communicate through the drawing of pictures and hand writing of notes.

At the time of writing this paper I had envisioned the creation of a design intervention which I was calling *Fraggle Rock* as mentioned in the conclusion section. As things progressed after the second design intervention *Fraggle Rock* did not go forward as initially thought but evolved into the InstaBooth which focused more on community engagement in public spaces instead of user awareness in library settings.

Caldwell, Glenda, Bilandzic, Mark, & Foth, Marcus (2012). Towards visualising people's ecology of hybrid personal learning environments. In Brynskov, Martin (Ed.) *Proceedings of the Media Architecture Biennale 2012*, Association for Computing Machinery (ACM), Aarhus, Denmark, pp. 13-22.

Abstract

Ambient media architecture can provide place-based collaborative learning experiences and pathways for social interactions that would not be otherwise possible. This paper is concerned with ways of enhancing peer-to-peer learning affordances in library spaces; how can the library facilitate the community of library users to learn from each other? We report on the findings of a study that employed a participatory design method where participants were asked to reflect and draw places, social networks, and activities that they use to work (be creative, productive), play (have fun, socialize, be entertained), and learn (acquire new information, knowledge, or skills). The results illustrate how informal learning – learning outside the formal education system – is facilitated by a personal selection of physical and socio-cultural environments, as well as online tools, platforms, and networks. This paper sheds light on participants' individually curated ecologies of their work, play, and learning related networks and the hybrid (physical and digital) nature of these places. These insights reveal opportunities for ambient media architecture to increase awareness of and connections between people's hybrid personal learning environments.

Categories and Subject Descriptors

Human-centered computing → Participatory design, Applied computing → Interactive learning environments.

General Terms

Design, Experimentation, Human Factors

Keywords

Ambient Media, Urban Informatics, Responsive Architecture, Personal Learning Environments, Free-Choice Learning, Informal Learning, Library Studies, Visitor Engagement, Participatory Design

Introduction

It is out of lived experiences and through applied meaning that people as groups or as individuals change spaces into places (Carmona et al., 2010, pg.120). Architecture as a discipline is concerned with informing the design of physical infrastructure in a way that accommodates the conceived function of a particular space, therefore creating place. Information and Communication Technology (ICT), in particular social media, helps to overcome proximity and time challenges within physical space, thus affording social interactions that would not be otherwise possible.

Ambient media are a combination of both, architecture and ICT, combining assets and affordances of the physical as well as digital space. Ambient media is said to “convey knowledge distributed in time and space throughout the natural environment of consumers through a digital overlay morphing with physical daily objects” (Lugmayr et al., 2009, pg. 338). Ambient media has the ability to create an embodied hybrid space with publicly visible and accessible properties that form part of the physical environment. This can be done using digital assets, allowing people to bridge spatial, temporal, and social barriers as part of their situated spatial experience. In contrast to mobile phones or laptop computers, ambient media is, similar to physical architecture, continuously perceived in the periphery of people’s attention. The nature of ambient media shapes people’s spatial experience when at a place, rather than just providing information. The adaptation of location-based services, social sensor networks, ubiquitous computing devices and the Internet of Things, promises semantic ambient media installations (Pogorelc et al., 2011) that are capable of providing context-aware, personalised, and interactive services.

The design space of ambient media embraces both bits as well as atoms. Hence, ambient media designers make use of skills and practices from traditional architecture as well as ICT

and digital media. This gives rise to a new discipline that is specifically concerned with the design of ambient media. We hereinafter refer to this discipline as “ambient media architecture.” Ambient media architecture provides opportunities for situated experiences and social interactions by combining digital space with physical place. However, similar to traditional architecture and media development, the design of ambient media architecture needs to be informed by the socio-cultural nature, needs, and issues of the place that the artifact is targeted at.

This paper aims to inform designers how ambient media architecture can augment public library spaces in their role as informal learning environments. By examining the opportunities for ambient media architecture to reveal personal learning environments, the library user experience can be enriched.

Background literature

Informal learning is learning that happens outside the formal education system, such as by visiting a library, zoo, museum, or reading a book during one’s leisure time. Public libraries, as traditional advocates of open and free access to knowledge and learning, try to attract people from all kinds of professional, cultural, and socio-economic backgrounds. This exposure to diversity has been shown to generate trust, tolerance, and social capital among people in the local community and society at large (Audunson et al., 2011; Cox, 2000; Goulding, 2004), but also claimed to be a fruitful platform for the peer-driven creation and co-creation of knowledge (Aabo et al., 2010; Sinclair, 2007; Talve, 2011). In addition to the socio-cultural diversity of its user community, the library as a place provides opportunities for serendipitous discoveries and learning. For example, library visitors find a particular book and are exposed to other books, magazines, community event brochures, and co-present visitors that are dispersed within the library space. These encounters provide affordances for people to serendipitously stumble upon information that they would not otherwise browse or explicitly search for (Björneborn, 2008; Björneborn, 2010). Such room for game and serendipity is a useful quality of the library as a place, and a reason why people often prefer it to e- library services.

Björneborn argues for libraries to provide design interventions that encourage divergent (explorative) information behaviour across physical, digital, and social library interfaces

(Björneborn, 2010). However, serendipitous exploration of physical and digital information resources is limited by their ambience and visibility in the physical space that library visitors are exposed to. Open bookshelves, signs, posters, and event brochures are examples to facilitate divergent behaviour. In terms of online resources, a sign or a pointer to a URL somewhere in the physical space increases the chances for being serendipitously stumbled upon by an interested user. With social library interfaces, Björneborn refers to the librarian as an additional information resource who can be consulted by visitors for questions and issues. Recent research studies recognise libraries as attractive meeting places (Aabo & Audunson, 2012; Aabo et al., 2010; Audunson, 2005; Audunson et al., 2007), not only librarians, but in particular other, co-located library users are seen as potential information resources and facilitators to acquire new knowledge.

This paper is concerned with ways of enhancing such social library interfaces; how can the library facilitate the community of library users to learn from each other? Information, knowledge, experiences, and skills of co-located users in the library, which might potentially trigger interest, shared encounters and serendipitous discoveries, remain invisible and hard to identify. While online spaces, such as blogs, forums, wikis and social networks are more transparent and provide powerful tools to search and discover specific (social) information, they lack the richness of face-to-face encounters, and all benefits of immediate social interaction. Ambient media architecture has the potential to combine the benefits of online and physical spaces by materialising relevant information through digital fabrication, interactive public screens, 3D projection mappings, amplified or augmented reality, and other technologies in the hybrid space. This research matches learning theories with opportunities provided by ambient media to augment the library as a place for social and informal learning. What are the opportunities for ambient media architecture to tap into the knowledge of its user community and provide it as an additional (social) information resource to other, co-located library users?

Informal Learning Environments

Learning is situated in and facilitated by different environments. Formal learning environments such as schools or universities are highly institutionalised and follow a strict curriculum. Non-formal learning environments are based on voluntary participation outside

the formal education system, but are still organised and coordinated by a central institution with a fixed curriculum, such as schools providing cooking classes, driving lessons, and language lessons.

However, not all learning occurs in the classroom. Informal learning environments are often places of physical, emotional, and social comfort that provide stimuli to the senses outside of the typical educational setting. In contrast to formal and non-formal learning, informal learning is learner-centric, driven by the learner's personal needs, interests, and motivations. Livingstone defines informal learning as "any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria" (Livingstone, 2001, p.4). The significance of informal learning is substantial. According to Grebow (2002), 75% of the knowledge and skills people acquire and adopt through their lifetime, are based on informal learning activities, as opposed to only 25% through formal learning. Learning is more effective when driven by intrinsic motivation and interest, rather than extrinsic motivations such as grades or certificates.

Schugurensky describes such self-directed learning as "learning projects undertaken by individuals (alone or as part of a group) without the assistance of an 'educator' (teacher, instructor, facilitator), but it can include the presence of a 'resource person' who does not regard herself or himself as an educator" (2000, p.50). Learning can take place anywhere, anytime, but what is critical for informal learning is that the learner decides when, where and how they learn (Pesaneli, 1990). There are many places (i.e. informal learning environments) that facilitate different types of learning. Falk and Dierking (2002) define such environments "Free Choice Learning Environments" (FCLE). FCLEs such as history and science museums, wildlife parks, zoos, or aquariums facilitate learning, but leave it to the individual visitor "to control what to learn, when to learn, where to learn, and with whom to learn" (Falk & Dierking, 2002, p.6). However, the physical and socio-cultural context of the space (Falk & Dierking, 2002, p.37) stimulates, facilitates, and supports learning.

In accordance to that, Schugurensky (2000) highlights that informal learning does not always have the form of dedicated learning projects that follow intentional and conscious activities. It is often incidental and socialised, embodied in physical and social experiences that we make through interactions with the external world and the social system that we are exposed

to. Such learning often happens serendipitously and sometimes without the learner being actually aware of what they have learnt. It is part of human nature to learn through sensuous connections and relationships with the physical environment and the social world. Thus, different types and qualities of learning environments, places or spaces – physical or virtual – can provide alternative learning experiences (de Carteret, 2008, p.507; Mathison, Wachowiak, & Feldman, 2007). Mathison et al. (2007, p.206) found that addressing emotional states and stimulating the senses triggers brain function and assists in the learning process. The informal learning process is an individual experience where different types of environments are suitable to different types of people.

Crucial to the success of informal learning environments is the creation of communities around these environments and their development. Communities are not defined by fixed or homogenised collectives but are fluidly created by the diverse people that act within the group through informal networks (de Carteret, 2008, p.509). “Context is relevant to informal learning. It involves the interrelationships of people and place” (de Carteret, 2008, p.507).

Physical and Digital Learning Environments

Physical, digital, or hybrid environments can facilitate learning, where the digital and physical properties augment each other. The matrix in Figure 21 provides an overview depicting how different environments facilitate formal, non-formal, and informal learning.

Universities exist as physical places, however sometimes also offer dedicated e-learning platforms to pursue courses or entire degrees over distance that do not require physical attendance. Non-formal learning environments such as language schools exist as purely online or offline services. Many universities have joined the open courseware consortium (OpenCourseWare Consortium, 2012), providing free and open study materials to the general public. These materials still follow a structured curriculum and evaluation tools, but in contrast to enrolment in official university programs, they do not require previous schooling and do not offer an official degree upon completion.

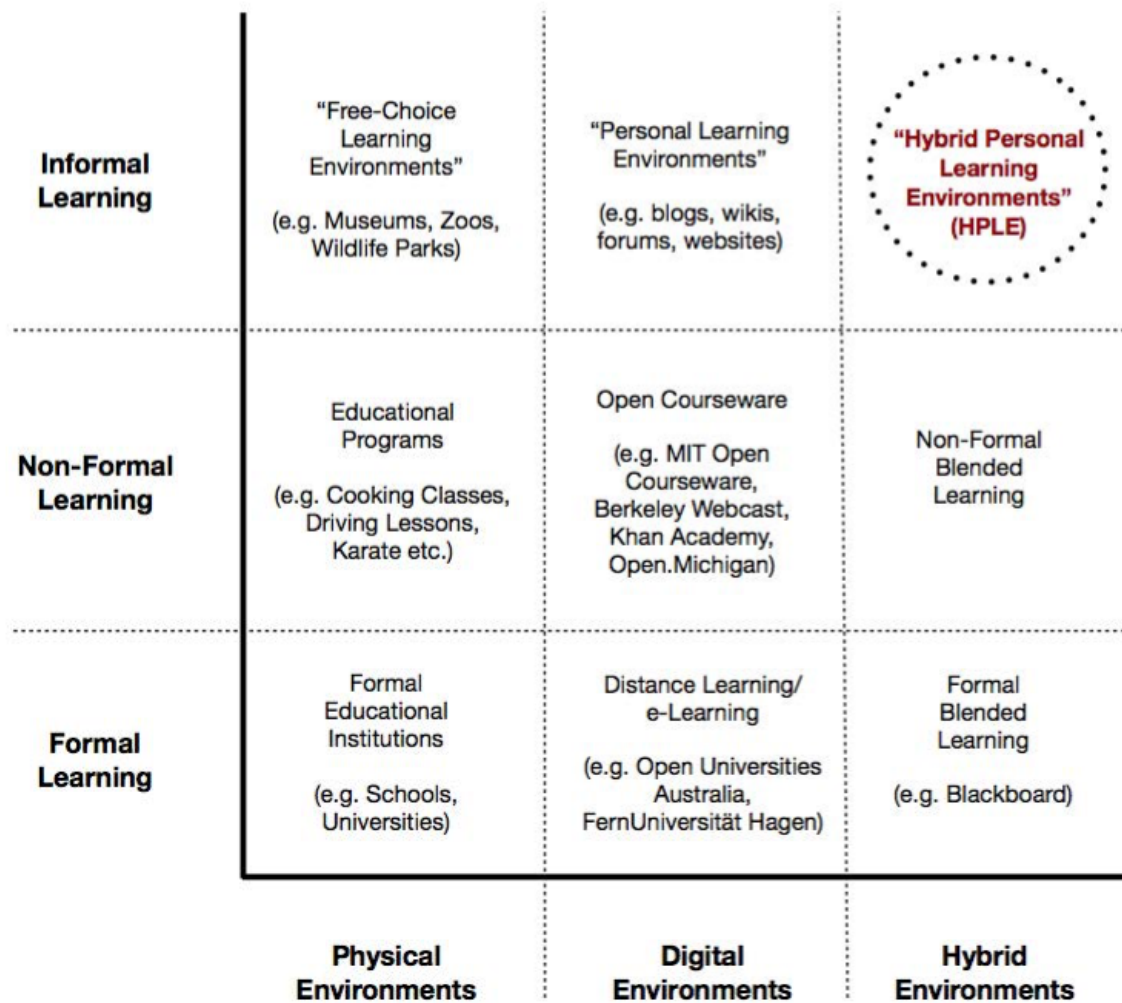


Figure 24. The physical, digital, and hybrid nature of formal, non-formal, and informal learning environments

Formal learning institutions have recognised the benefits of blended (or hybrid) learning. Schools and universities increasingly provide digital platforms that complement their offline courses with supplementary learning materials, links to external resources, online communication channels between learners and teachers, etc. Those tools are often controlled by the educational institution, and provided as integrated parts of the courses.

However, communities of practice and informal learning evolve due to the nature of mobile devices and increasing possibilities to connect virtually outside of the physical classroom (Skiba, 2011). Students augment their social learning experience by connecting through their selected online environments of choice such as Facebook or Skype rather than the digital platforms and infrastructures provided, mandated, or supported by the learning institution

(Beetham, 2008; Guldborg & Mackness, 2009). Mobile learning by way of iPad, iPhones, smart phones, and other intelligent devices affects how and when students learn. Many students of today have embraced using technology to communicate, socialise and access information (Behling, 2010). Such practices, as Beetham puts it, form an “underworld” (2008, p.465) of informal learning outside the “classroom,” but are frequently enabled and sustained by the use of technology.

Siemens (2005) describes connectivism, a learning theory that builds upon the self-directed style of informal learning, the social aspects of learning highlighted by social constructivism, and the significance of digital tools and media and communication channels as part of the learning experience. Connectivism values learning as knowledge that does not reside in an individual’s head, but rather spread across a complex environment of many external resources, for example social networks, online databases, fact sheets, books, videos, and blogs. Hence, learning in this sense is based on the learner’s ability to recognise and connect to specialised nodes of other knowledgeable people and information sources. As Siemens describes, one of the core principles of connectivism is that the “capacity to know more is more critical than what is currently known” (Siemens, 2005, p.5).

Every learner creates their own Personal Learning Environment (PLE) according to their needs and preferences. In contrast to a Learning Management System that is course-oriented and controlled by the educational institution, a PLE is an individually curated ecology of online tools (search engines, social bookmarking platforms, etc.), sharing services (YouTube, Flickr, WordPress, etc.), information resources (wikis, databases, e-books, e-journals, etc.) and communication channels (instant messaging, video-conferencing, forums, etc.) that people use to assist, document, and share their learning progress (Educase, 2009). The nature of PLEs, evolved through the rise of Web 2.0, are interactive and collaborative in a way that they enable learners to provide feedback and comment on each other’s content. Such connections between PLEs form a Personal Learning Network (PLN), a network of individual people and their PLEs established to support and accompany each other’s learning processes.

Hybrid Learning Environments

Most literature on informal learning environments study informal learning either as a phenomenon that is situated in the physical space, or online. Former are focused on the design or nature of physical settings that facilitate learning, such as in museums (Bamberger & Tal, 2007; Falk, 2009), wildlife (Falk, Heimlich, & Foutz, 2009) and other educational leisure environments (Packer, 2006), libraries (Martin & Kenney, 2004; Niegaard et al., 2009; Shill & Tonner, 2004), and dedicated learning environments in general (Chism, 2006; Chism & Bickford, 2002; Joint Information Systems Committee (JISC), 2006; Oblinger, 2006). Connectivism and PLEs are described as purely online- based networks of tools, platforms and services.

Blended learning as a phenomenon that is fertilised by both the richness of physical face-to-face interactions, as well as opportunities and connections provided by digital tools, is mainly discussed in formal learning literature. Behling and Klinger (Behling, 2010) question the appropriateness of technologically rich tools within formal learning environments to support face-to-face learning. Osborne et al. (2011) investigate the effect of blended learning environments on architectural education and conclude that blended learning has different levels of success within the formal education of architecture based on factors ranging from pedagogy, technology, and environmental compatibility. Attention needs to be paid to the range of learning environments – face-to-face and blended learning – to allow for different experiences for students with different learning styles.

Research Question

The learning theories described previously point out that informal learning is facilitated by many factors, in particular personal context, physical context, socio-cultural context, digital tools, and media, to collaboratively create, share, discuss, interpret, and evaluate information, skills, and knowledge. Individuals shape their personal ecology of learning environments in the physical as well as digital space. The ecology's curation is made up of physical places to read, work, socialise, and to pursue personal hobbies and leisure activities; through the choice of one's social environment such as meetup groups and community clubs; as well as through digital channels of choice, such as blogs, wikis, forums, or YouTube channels. We call an ecology of learning environments that is diversified and spread across digital and physical spaces: *Hybrid Personal Learning Environment* (Figure 22).

The public library as a space strives to facilitate peer-to-peer learning, and embrace its user community as an information resource and asset for fellow library users. One way of doing this is to expose people's personal learning environments and networks to each other. When these are exposed and communicated to each other, they can be enriched and built upon by others. Seeing objects or places that are relevant to an individual may attract others with similar interests and lead to a face-to-face interaction based on serendipitous discoveries of new topics and interests. Ambient media architecture provides tools to morph such social user information with the physical space of the library building.

This is the point of departure for our study which asks, what should these mediated, social interfaces look like? What content and information should they provide? And, how should they be represented? In order to provide answers to these questions, we employ a participatory design research method that asks participants to reflect on their personal learning environments.

Methodology

Rather than restricting the insights to learning resources within the library, the method focuses on revealing any personal places, activities and social networks where people *work* (being productive, being creative), *play* (having fun, socialising, enjoying, being entertained) or *learn* (being inspired, acquiring or modifying knowledge and skills), as well as the relationships between these environments. The vision is an ambient medium within the library that visualises a collective network of personal learning environments and resources, enabling library users to explore, serendipitously stumble upon, and be inspired by each other's learning environments. The insights from this study will inform the design of such an ambient medium.

In response to our research question a participatory design (Greenbaum, 1991; D. Schuler & Namioka, 1993) method was devised. Participatory design is used in many fields including architecture, urban design, and computer systems design with the common goal of including stakeholders' participation in the exploration and development of a design problem. Our main concern revolves around how participants communicate their personal learning environments. As discussed by Sanders et al. (2010, p.195) the participatory design method can be utilised to generate a starting point for subsequent development. Based on the framework for

participatory design created by Sanders et al. (2010) we can describe our participatory design activity as a creative intervention.

The method is designed with two goals in mind: First, it aims to shed light on people's perceived geography and ecology of their learning environments, and how learning is embodied across their everyday lives, activities and places. Second, the methodological design aims to close the gap between ethnography, which is often regarded as a "prolonged activity" (Hughes et al., 1995, p.59) that causes time pressure if particularly dedicated to inform system design, and "quick and dirty" ethnographic methods, such as short term observations or quick user interviews. The method consists of a 30 minute + 30 minute activity with 1-2 researchers and 5-10 users to provide a first overview of people's learning environments. This serves as a stepping-stone to better direct follow-up ethnographic research or in-depth user interviews. We designed the method in particular to inform the role of ambient media architecture installations within an individual user's ecology of personal learning environments, however it might also be useful for researchers, curators, and managers of informal learning environments to inform other design interventions.

Research Participants

The *form* of the intervention was based on making tangible things such as drawings, followed by focus groups, allowing participants to describe their drawings. The *purpose* of the activity was to get a deeper understanding of participants' experience of places associated with work, play, and learning. The *context* involved face-to-face sessions with two different groups of people. Both sessions were conducted in participants' own usual environment. The first intervention was conducted with a meetup group that meets on a weekly basis at The Edge, the digital culture centre and collaboration space of the State Library of Queensland in Brisbane, Australia. The group is named "Hack The Evening" (HTE) and consists of 14 people that regularly attend the meetings every week, including 3 high school students, and one young woman. The rest of the participants are male ranging in age from 22-55 years. During the meetings people usually socialise, exchange and discuss news, and collaborate on projects related to interactive technologies and media. Some of the participants have known each other from the Hackerspace Brisbane (HSBNE), a workshop space open to like-minded people interested in DIY technology and hacking. The HTE meetup group has been meeting

weekly for approximately 18 months and participants were familiar and friendly with each other. This comfortable atmosphere may have assisted in the high level of engagement by all participants.

The second intervention included a group of five higher degree research (HDR) students that work together in a research lab at Queensland University of Technology, in Brisbane. The group consisted of 4 men between 25-38, and one 31 year old female participant. These participants have known each other for approximately 12 months or more. The HTE meetup group and HDR student group were selected as participants who are likely to have a rich established network of informal learning resources, hence providing valuable insights as pilot groups for the exercise.

Participatory Design Exercise

The participatory design exercise was developed utilising basic and familiar materials such as coloured markers, paper, and stickers. These materials were intentionally chosen to be low tech so that any person could relate to them. The use of coloured markers and stickers were used to distinguish information but they also gave the intervention a sense of fun and playfulness. The participatory exercise was explained to the participants asking them to draw places relating to three key themes: work, play, and learning. It was our primary concern to make participants feel comfortable with the drawing exercise; therefore the quality of the drawing was secondary.

In accordance with the theories described earlier, informal learning is a messy process, distributed across various physical places, online tools, platforms, and social networks embodied in other everyday activities, such as hobbies or social events. In an attempt to capture the full body of informal learning experiences in people's everyday lives, we asked the participants to focus on places and activities where they work, play, and learn. Work, play, and learning places are not mutually exclusive, but can overlap. We, for example, introduced "work," not only as one's business office and workplace activities, but rather any environment and activity where one feels as being productive or creative. Similarly, we introduced "play" for people to reflect on places and activities where they have fun, socialise, enjoy themselves, or are entertained. "Learn" relates to any places or activities where people feel inspired, acquire or modify knowledge and skills.

The same process was employed with both groups. The participants were given a series of six instructions directing their reflection process during the drawing phase. First, participants were asked to think about the work, play, and learning places, which are part of their daily lives. They were asked to draw these places on a piece of paper and then notate and label the places with keywords indicating the nature of the place. On a sheet of trace paper participants were asked to draw activities that are not attached to a particular place. Then, participants used between 1 and 3 coloured dots to indicate levels of intensity of work, play, and learning that related to the places and activities that they had drawn on their papers (1 dot = low, 2 dots = medium, 3 dots = high intensity). The drawing exercise was followed by a focus group where participants discussed their drawings. Each phase, drawing and the focus group discussion took approximately 30 min. The following guidelines were used to assist the execution of the participatory design exercise.

A. Drawing Activity (30 min): Let participants draw on an A3 sheet of paper guided by the following instructions:

- 1) Starting with the place you are in now, draw a diagram of places where you engage in working, playing or learning activities [use colour 1].

- 2) Write down keywords of your activities / interests that you pursue at these places [use colour 2].

- 3) Grab a trace paper, write down keywords of any other activities/interests/social networks (that are not necessarily fixed at a particular physical place) [use colour 3].

- 4) Place between 1-3 dots depending on how productive (work: blue dot), how much fun (play: yellow dot) or how much you learn (learn: green dot) at the different places / activities.

5) Place between 1-3 red dots depending on how relevant physically co-located people are for your work, play, learn experience at the different places / activities.

6) Add anything else to your drawing that seems important to you as part of your work, play, learn experience.

B. Focus Group Questions (30 min): Discuss with fellow study participants the following aspects of the drawings:

1) Explain your drawing and what you did in order to communicate your relevant places and activities.

2) Explain the relationship between work, play, and learn at different places.

3) Explain the role of co-located people at your relevant places and activities.

Findings

The participatory design intervention provided rich data and insight into the way that people perceive and communicate a wide range of physical and digital places that are a part of their everyday lives. The findings are broken down into two main sections. The first one discusses how the participants represent places for work, play, and learning through the act of drawing. The second section examines the relationships of places for working, playing, learning, and the informal learning environments, which participants choose to occupy.

Analysis of Drawings

Through the making of a drawing it is possible to observe how people visualise and communicate their understanding of places for work, play, and learning. When examining the drawing of places, four common trends emerged: the use of objects, symbols, shapes, and plans, all of which can be seen in Figure 22.



Figure 25. This drawing shows a combination of drawing techniques to communicate different places

Common attributes of drawing approaches are categorised into four groups: hierarchy of place, geographical relationships, sub-location, and time. The hierarchy of place is communicated in the drawings by a range of approaches including size, position, and order. Placement on the paper in order of importance is evident with some of the drawings, where the most significant place is at the top of the page followed by lesser important places. The size of the place drawn also indicates hierarchy, for example Figure 25 shows how one participant drew home as a large circle in the middle of his paper indicating it is central to his everyday life.

“I drew my home in the centre as a big circle, because that’s the centre of everywhere, I am either going to or from home,” (J1).



Figure 26. Drawing of home as central to everyday places

Geographical relationships are communicated in some of the drawings by including major geographical features such as a river. Places are drawn and positioned on the paper in relation to the river, therefore indicating the geographical relationship of places with one another and their location within the city.

“I draw a map essentially, it’s not (to) scale. I have a river in the middle, that’s that line. Well, Brisbane river... because I live on the south side, but mostly places I go to are on the north side as well,” (JN1).

By combining drawing techniques some participants began to draw sub-locations or smaller parts of larger places. Different activities occur in different sites within home or work (Figure 26).

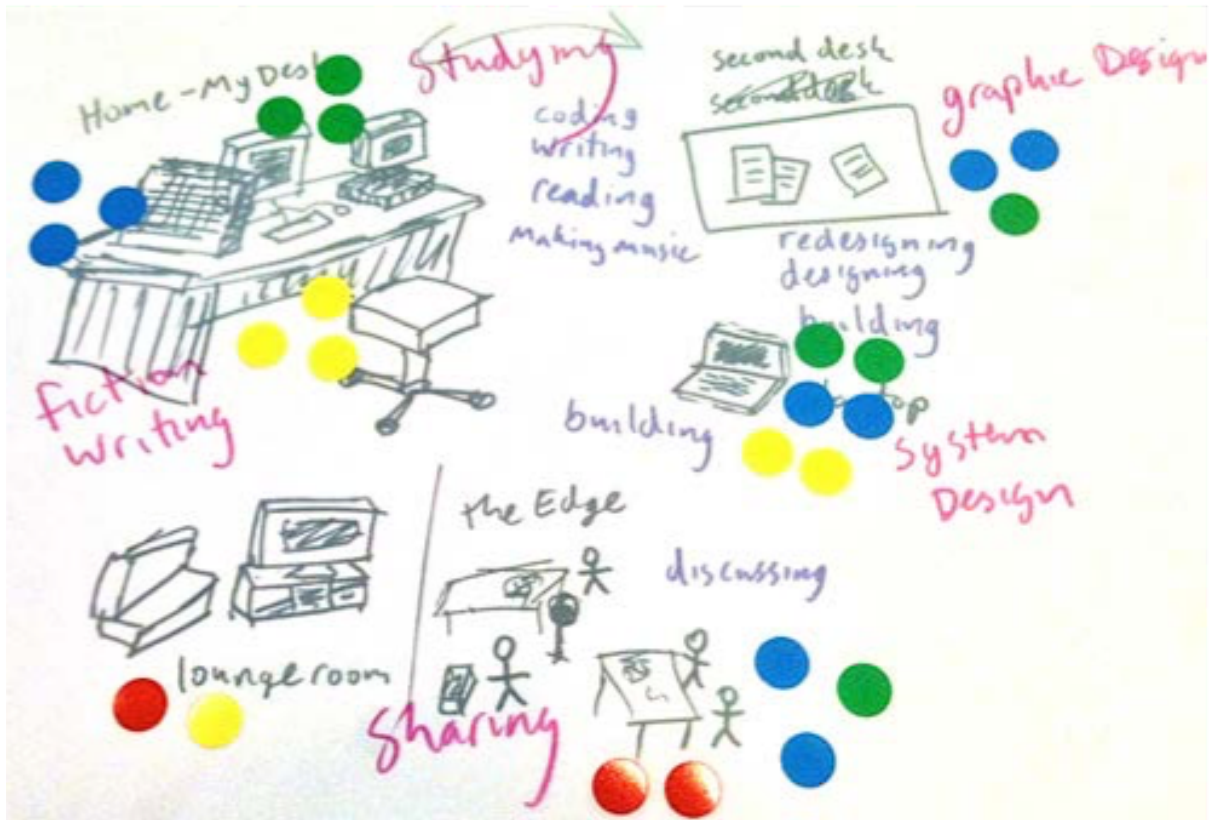


Figure 27. This drawing shows different desks with different activities occurring in the sub-locations

Often participants drew computers and TV screens acting as portholes to digital media and the Internet. The Internet itself is sometimes drawn as a separate place or cloud, indicated through a description of online activities such as “gaming,” “reading,” or “blogs.” One participant organised his drawing based on time. Examining Figure 27, it can be seen that the positions of places on the paper were drawn in a cyclical manner based on a typical day.

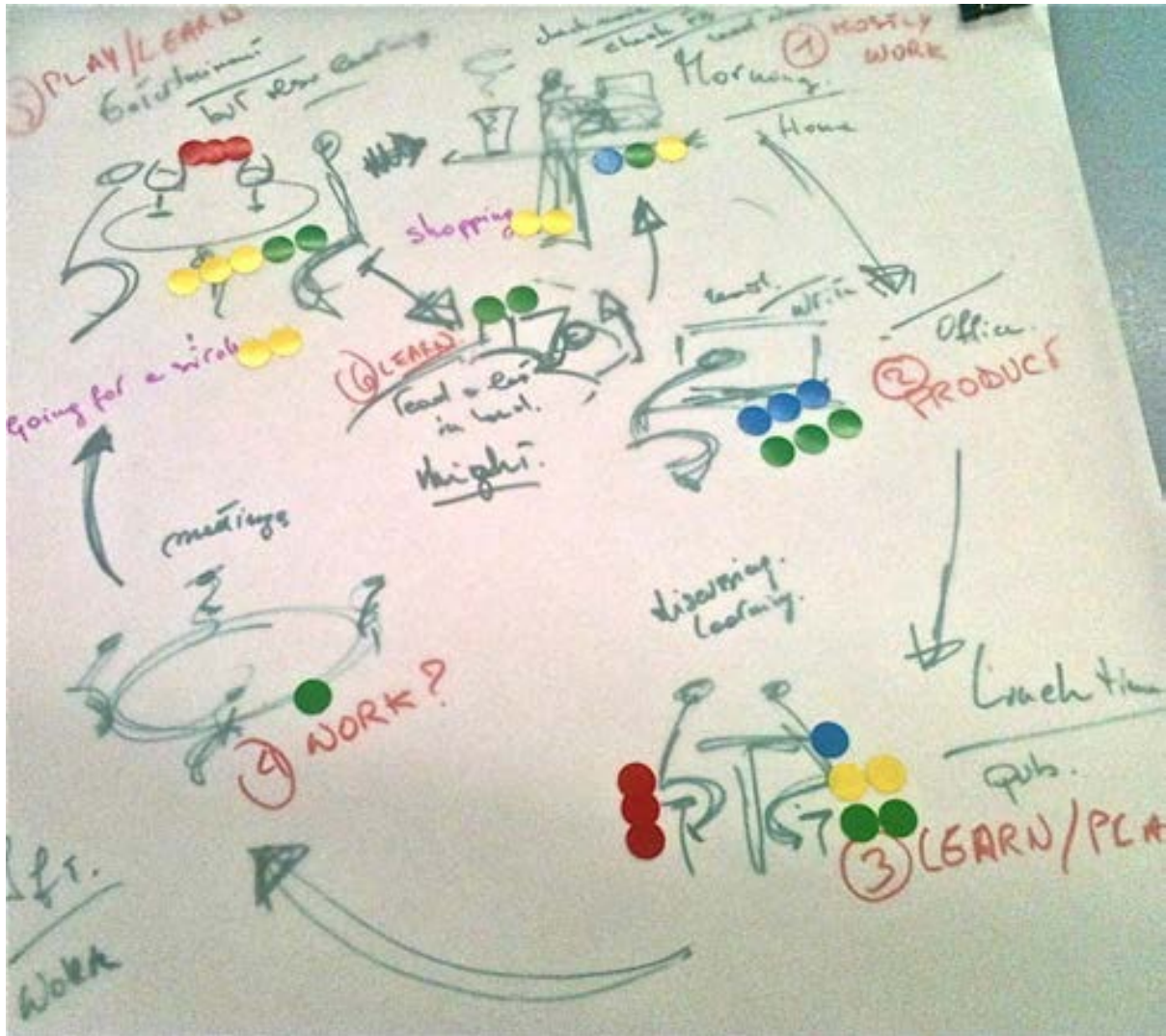


Figure 28. A drawing of work, play, and learning places based on time

The top of the cycle began with the morning where the participant drew himself at the breakfast table reading the newspaper and checking his phone. This is followed by the morning at a desk at work. Midday or lunchtime is positioned at the bottom of the paper. The afternoon shows a meeting room where work meetings take place and the cycle ends with dinner followed by the participant in bed reading. In the focus group this participant described how he negotiates the amount of play in his day based on how productive he has been during the day. He allows himself to read a fun book at night if he has been productive at work, if not he reads a heavy book that is work related and therefore ending the day with increased productivity.

Relationship among Work, Play, Learn

Examining the drawings gives an overview of the sorts of activities each participant engages in at the places they have drawn. The intensity of work, play, and learning associated with these activities is indicated by the participants' use of coloured dots. Typically places are characterised by a range of one or more activities associated with work, play, and learning. Rarely would a place have only a dot of one colour. This reveals a cross-correlation of such activities within multiple places.

The drawing from one of the participants in Figure 29 shows that he drew the coffee shop with associated blue dots (work) and yellow dots (play). The participant did not include any red dots meaning there is no importance of co-located people to his experience at the coffee shop. His experience of that place is purely personal. This same participant drew a pub, which did include red dots (co-located people) indicating there is an importance of co-located people to his experience at that place. Although both the pub and the café are public spaces typically associated with social activities, it can be noted that these places have different meanings for different people.

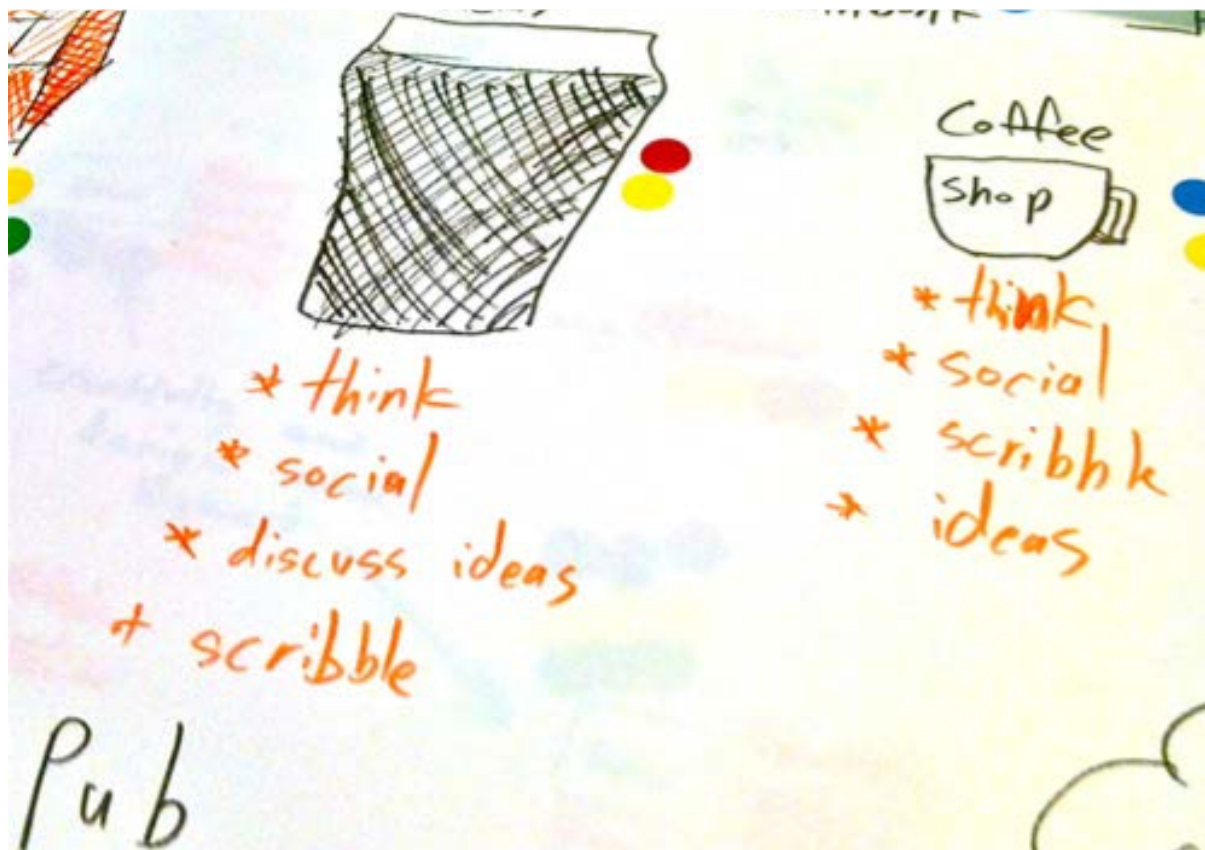


Figure 29. The importance of co-located people

Another example of this is highlighted when examining how participants represent their home. For one participant home is the central and largest place on his drawing (Figure 30) indicating it is very important in his life. His home has elements of play as well as socialising, revealing it as a fun place dependent on the other family members who are at home.

One of the participants dedicated a large portion of her drawing to home (Figure 30). She seems to do everything at home including crafts, gaming, reading, and daydreaming. She spends a lot of time playing and learning at home, indicated by yellow and green dots. Home appears to be a creative place for this participant as many activities are described by key words such as making interactive dolls and 3D printing. Her home has a sub-location represented by the drawing of her bed, a place for other activities such as reading, web browsing, sewing, learning, playing iPad games, and listening to music.

“I’ve got my studio at home which is where I do the most stuff, and I have the most fun and I do a lot of learning. I drew a lot of stuff that is in that room and it’s the biggest,” (A1).



Figure 30. Home is drawn to show where a lot of different work, play and learning activities take place

Conversely, for another participant home was not even drawn on his paper.

“I haven’t mapped out home, because even though I am there outside of work it’s not really anywhere I do anything specific in...” (B1).

When examining the participants’ drawings and looking at the workplace, the intensity of work indicated by blue dots varies from one person to the other. Some of the workplaces include elements of play (yellow), some include learning (green), and some include the importance of co-located people (red). For one of the participants the workplace can be understood as a fun place with high amounts of play (yellow) and learning (green). However, play and learning are not dependent on other people as there are no red dots. The actual work itself is fun for the participant without needing to interact with anyone else.

"...because I love going to work, it's a great place... I ahm... don't like all the people at work. Basically I go there to work, and I sort of keep to myself. Cuz I am the only one who does what I do at work, so I don't need to interact with anyone," (J2).

The intensity and range of dots tended to correspond to how much people liked their place of work. Places of work with high levels of play and social elements seemed to be more enjoyable places than those with only elements of work (blue) and learning (green). For some of the participants the workplace is purely about producing or conducting a service (Figure 31).

"...I've defined my work as the 'grind house' because it really is... you get a task, you do a task, consistently, repeatedly, so yes you are being productive, but not in a way that actually feels to me as being productive..." (B2).



Figure 31. Drawing of work as the "Grindhouse"

Places that are marked with all colours are associated with work (blue), play (yellow), and learning (green). Per definition, those places provide an experience to users where they feel creative, entertained, and have a social experience all at the same time.

“...there is band practice which I have been doing lately with my friends, that is interesting because it’s a bit of learning and also equal parts learning equal parts play, there is a bit of work there because, um, writing songs are being constructed...” (K).

We are interested in what such personal “buzzing” places have in common, and filtered them accordingly. The criteria for a “buzzing” place are a minimum of two dots of each colour. The resulting locations turn out to be places such as friend’s houses, the library, public urban places, particular suburbs, the internet, as well as hobbies, leisure activities, community places or meetup groups such as a dance performance group, local board games / cards club, where people come together and interact based on their common interests. The common factor amongst these places is that they are places where people can meet face-to-face and rely on these encounters to be productive, to learn from one another, and to enjoy the company and knowledge of others.

“I was going to say about The Edge, I am not sure I would come here if there was no one else here, because... if I wanted to work on something that didn’t need anyone else’s help, I would do it at home, but you come here because you want to talk to other people because you want to or because you need their help, their opinion,” (K1).

Figure 31 shows a drawing that depicts a “buzzing” place, the Hackerspace Brisbane (HSBNE), a workshop space for like-minded people interested in DIY technology, tinkering and hacking.

“...the space [Hackerspace Brisbane] is probably where I spend a lot of my efforts. I get a lot of work done there, a lot of play done there, I get a lot of learning done there, because there is a lot of like minded people that know a lot more about some things than I do and I know a lot more about some things than they do so it’s very much a collaborative environment...” (B3).

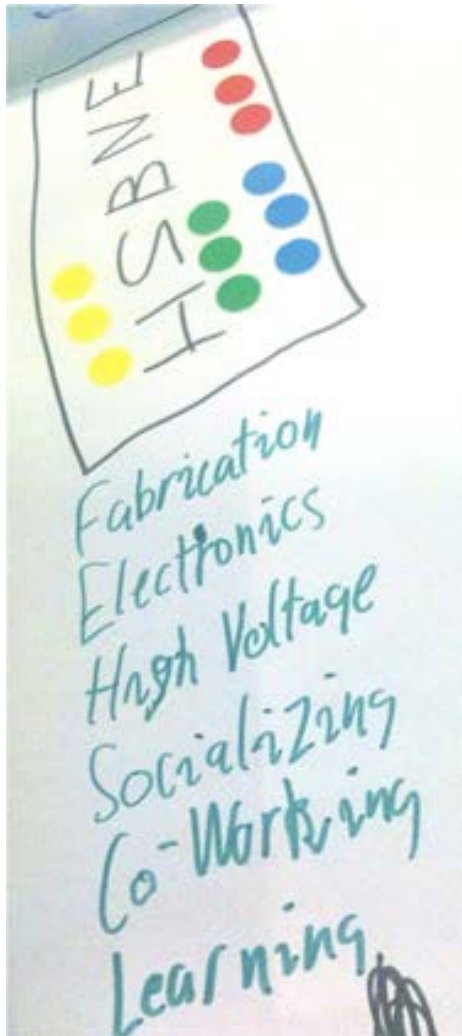


Figure 32. This drawing highlights places with dots from each category highlighting “buzzing” places

Discussion

The drawings illustrate how informal learning occurs across a network of online and offline learning environments that are particular to each user. In contrast to the separation in research literature, informal learning is not a purely online or purely offline experience. It is shaped by an individual’s participation in activities and social networks across virtual, as well as physical environments.

Furthermore, informal learning does not exclusively take place at dedicated informal learning environments (e.g. library, museum, etc.) or during dedicated learning activities (e.g. reading a book), but rather embodied in everyday activities and places that involve social interaction, productivity, and fun. Every individual is involved in a range of physical places, online spaces, activities, community groups, social networks and technologies that facilitate access

to, interaction with, and across those networks. Individual needs and interests shape the choice and intensity of involvement in such networks. Hence, each person's informal learning experience is a personalised patchwork of online and offline networks that facilitate learning in one-way or another. Previous literature has used the term 'communicative ecologies' (Foth & Hearn, 2007; Hearn & Foth, 2007) to describe social communication and interaction patterns as experiences that are formed, shaped and maintained across different media, technologies and physical environments. Similarly, the findings in this paper give rise to the assumption that informal learning is formed, shaped, and maintained as learner-specific ecologies of hybrid personal learning environments.

These findings provide a starting point to understand how people experience, create, and maintain their personal ecologies of learning networks and environments. Figure 33 is a diagram of the nature of people's ecology of hybrid personal learning environments (HPLE) as personal selections of networks across three different layers (HPLE 1-3): Technology, place, and people (Foth, Choi, et al., 2011). Each layer and the connections between the layers differ from person to person, as these connections create HPLE networks particular to the individual. This initial study provides empirical grounding for the theoretical concept of HPLEs.

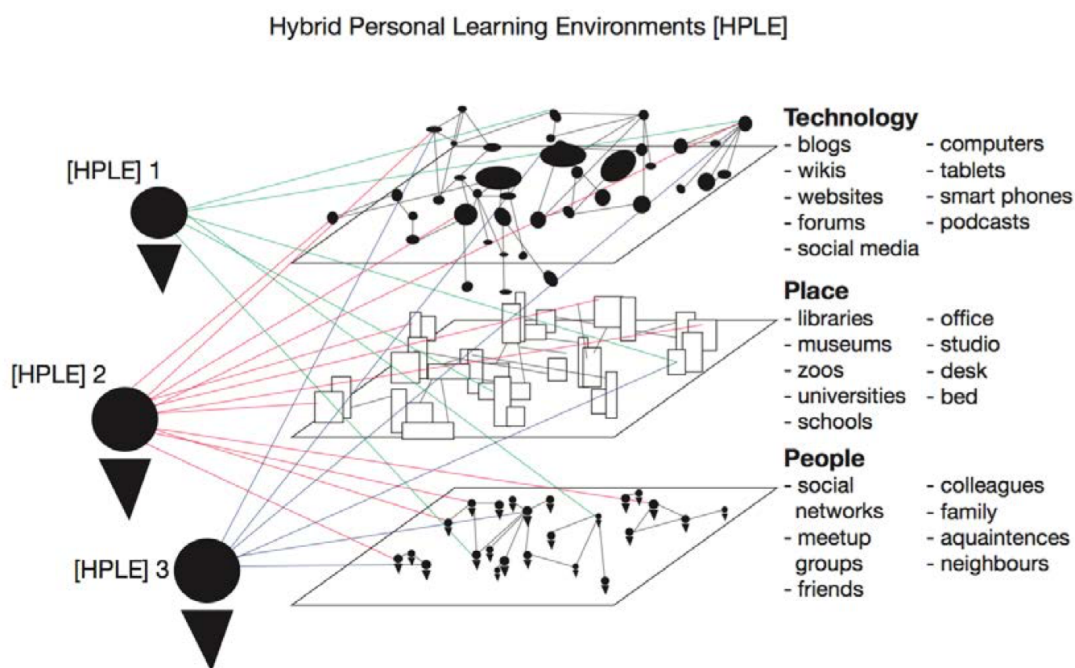


Figure 33. Hybrid Personal Learning Environments are personal selections of networks across different technologies, places and people

What do these findings mean for the design of ambient media architecture in libraries? Our participants, for example, outlined interests and hobbies such as interactive doll making through microcontrollers, circus performance practices, the making of laser light shows, or strategy card games. Each of those activities is bound to particular places, community groups, or other networks.

Ambient media architecture that reflects such ecologies of HPLEs, for example, through representations of people's places, social networks, hobbies, activities, communities, subcultures, special interests groups, tools, media and technologies, may provide valuable insights, inspiration and serendipitous discoveries of new topics and interests to other library users. Such ambient media architecture would provide an interface to the social capital within the community of co-located library users. An example would be a digital wallpaper that tells all users "who knows what" to facilitate connections to people with similar interests or complementary skillsets. However, how can the individual networks of learning environments be visualised and fed back to the user community? What design language can or should be used for communication? The findings from the participatory design exercise reveal ways that participants intuitively represent their own learning environments and networks. Through the process of making a drawing, participants had to reflect upon their personal learning experiences in order to visually communicate their work, play, and learning places. These drawings – similar to a rich picture (Monk & Howard, 1998) – provide insights into the ways in which non-designers visually communicate. From the drawings it can be seen that many of the participants rely on the use of symbols and objects to signify place. Written words were also used to describe the places and activities they drew. The use of different fonts and graphics helped participants communicate a hierarchy of importance and emotion. From this we can begin to derive a design language that is in direct response to the stakeholders' perceptions. The design language used to create ambient media architecture should speak in a language that is understood by the stakeholders to encourage their interest and participation. This design language will develop as a result of the design process and the input from the participants. The opportunity for ambient media architecture in the library space will be to visualise the urban ecology of personal learning environments and feed it back to the community. Furthermore, the drawings and follow-up focus groups identify

personal “buzzing” places where people learn, but also feel they are creative, entertained, and having a rich social experience all at the same time. The Hackerspace for example appears to be one such place for some people. Three of our participants report the Hackerspace as a regular hotspot for them to socialise, be creative, and learn new things through copious interactions, collaboration, and exposure to other likeminded members with complementary skillsets. The identification of such buzzing places provides a step towards further research about what happens when people engage in work, play, and learning activities at the same time.

Further in-depth ethnographic research at different “buzzing” learning environments (e.g. Hackerspaces) will provide insights about people’s interactions and learning experiences at these places. Why do some people perceive such environments as “buzzing”? What makes those people feel creative, entertained, and having a social experience all at the same time, and others do not? What is the nature of the physical and digital infrastructure at such places? What do the interactions at such places look like, and how do work, play, and learning activities combine and potentially cross-fertilise each other? Shedding light on these questions will help inform ambient media architecture as well as general design interventions towards making libraries more attractive environments to engage in informal learning activities.

Finally, the drawings also provide an understanding for how people organise their personal learning spaces. Our participants for example have different desks at home to pursue different activities, such as fiction writing, graphic design, coding, or 3D printing. Beds are used to surf the web and read blogs on iPads while relaxing at the same time. Such insights inform how the library as a learning space can be organised towards better accommodating people’s learning styles, needs, and habits. Designers might for example consider creating different zones for different activities, such as noisy areas for socialisation; small desks for focused individual work, and day beds to accommodate relaxed learning activities.

Conclusion

This paper presents a participatory design research method that asks participants to reflect on their personal learning environments. The participants reveal personal places, activities, and social networks where they work (being productive, being creative), play (having fun,

socialising, enjoying, being entertained) or learn (being inspired, acquiring or modifying knowledge and skills). The findings give rise to the assumption that informal learning is formed, shaped and maintained as learner-specific ecologies of hybrid personal learning environments (HPLEs). Informal learning is embodied in everyday activities and places that involve social interaction, productivity, and fun.

The results discuss opportunities for ambient media architecture to augment public library spaces by reflecting representations of people's HPLEs, hence provide affordances for divergent information behaviour, serendipitous encounters, and inspirations between fellow library users, which would otherwise remain invisible. This research will inform our further work. We plan the development of two design interventions, which sit within the domain of ambient media architecture: *Gelatine* and *Fraggle Rock*.

Gelatine is a check-in system that allows public library users to “check-in” with a personal HPLE profile confirming their presence at the library. Public screens and 3D projections will reflect a collective representation of all checked-in library users' HPLEs. Observations about user interactions and perceptions of the installation will provide further insight and feedback about the value of such ambient media architecture in library buildings.

Fraggle Rock uses digital fabrication for participatory media architecture in order to produce an interactive installation in a library. The installation will incorporate digital fabrication methods to translate social media data into physical artifacts to be used and combined by participants to represent their hybrid personal learning environments and networks. The artifacts are inspired by the crystal structures made by the humanoid ‘Doozers’ in the *Fraggle Rock* TV series. The purpose of the installation is to expose the interests and activities from each participant to each other by collectively building a physical construct. Once the networks are revealed and made public, participants can make connections with one another based on common interests. Based on the findings in this paper that people's learning experiences benefit from social interaction in physical places, the research aim of *Fraggle Rock* will be to examine how ambient media architecture crossing digital and physical representations can facilitate face-to-face encounters and social interactions in public places.

4.2 Write vs. Type: Tangible and Digital Media for Situated Engagement

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 4.2:

Parra Agudelo, Leonardo, Caldwell, Glenda A., & Schroeter, Ronald (2013) Write vs. type : tangible and situated media for situated engagement. In Sugiyama, Kazuo (Ed.) *Consilience and Innovation in Design Proceedings and Program, IASDR*, Shibaura Institute of Technology, Tokyo, Japan, pp. 4818-4829.

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDAL CALDWELL	Significant contribution to the planning of the paper, literature review, conducting the study, evaluating the data, and assisted with the preparation and evaluation of the manuscript.
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LEONARDO PARRA AGUDELO	Significant contribution to the planning of the paper, literature review, conducting the study, evaluating the data, and assisted with the preparation and evaluation of the manuscript.
RONALD SCHROETER	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript.

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

The following paper was co-authored with Leonardo Parra Agudelo a fellow PhD candidate within the Urban Informatics research lab and with Dr Ronald Schroeter. Leo and I conducted all aspects of the research together, we designed and deployed the intervention, collected and analysed the data and jointly wrote the paper. Leo has a background in interaction design and we had the common interest of exploring a hybrid approach to the interaction of situated users aiming at extending the reach of participation within community engagement processes. Dr Schroeter provided expertise and guidance with the paper structure, the deployment of *Discussions in Space*, and assisted in the editing and revisions of the paper. Leo presented the paper at the IASDR conference in 2013.

Preamble

Central to this paper was the comparative study between a tangible and paper based design intervention and a digital screen based intervention with the same purpose of engaging local participants with place based questions. The outcomes of the study indicated that the different media provided different levels of interaction; where paper based media attracted more meaningful responses and digital media allowed participants to interact remotely and extend their reach beyond the location of deployment. As a result the findings suggest that a hybrid approach which combines both digital and tangible media is a useful method to conducting community engagement which has heavily informed and influenced the design and development of design intervention #3.

Parra Agudelo, Leonardo, Caldwell, Glenda A., & Schroeter, Ronald (2013) Write vs. type : tangible and situated media for situated engagement. In Sugiyama, Kazuo (Ed.) *Consilience and Innovation in Design Proceedings and Program, IASDR*, Shibaura Institute of Technology, Tokyo, Japan, pp. 4818-4829.

Abstract

Digital media is often criticised for being intangible, transient and ephemeral. These characteristics limit the provision of long-lasting social experiences, as it is through the use of all our senses that we attach meaning to space, creating a sense of place. This paper presents a comparative study of the affordances of two design interventions, one tangible paper-based, called *Print + Talk = Love* (PTL), the other digital screen-based, called *Discussions in Space* (DIS). The emphasis is on a) how tangible media, such as paper, provides different and meaningful collective experiences, and b) how it can stand on its own as an interactive design intervention and as a comprehensive data-gathering tool in urban public places. By positioning PTL and DIS within the context of urban public places and testing their abilities to engage participants, we examine their particular situated engagement abilities through a mixed method approach. As a result, the digital aspects of DIS, e.g., using Twitter, extend the situated experience beyond the actual location of the intervention. Moreover, informing a hybrid approach, we also found that the physical aspects of PTL and its tangible presence, kept the user experience focused on the actual place and event surrounding the intervention.

Keywords

Situated engagement, user interface, tangible media, urban informatics, interaction design.

Introduction

Our social and cultural experiences are increasingly being influenced and mediated by an ever-expanding presence of ubiquitous digital products and social media, and a rising number of mobile devices (Dunne, 2006). Digital media has been criticised for being intangible and

largely confined to Graphical User Interfaces (GUIs), when it could be employing sophisticated human physical skills for sensing or manipulating physical environments (Hornecker & Buur, 2006; Ishii & Ullmer, 1997). By being confined to GUIs, Ishii (2008) notes that interacting with GUI screens is inconsistent with how we interact with our physical environment. Hornecker and Buur (2006) suggest that by including a tangible element to interactive artifacts, the social experience could be intensified and improved by building upon people's previous experience of interacting with the physical world. Further lowering the threshold for activity and supporting social interaction (Hornecker & Buur, 2006). In the context of this paper, we explore and compare the affordances and possibilities offered by tangible media, specifically paper, in contrast to digital media.

Print + Talk = Love (PTL), a paper-based engagement tool, and *Discussions in Space* (DIS), a digital public participation tool for situated engagement (Schroeter et al., 2012), were deployed in conjunction with each other at two public events in Brisbane, Queensland in 2012. Both PTL and DIS invite citizens to provide feedback about location-specific topics, such as their suggestions about how to improve a particular neighborhood. PTL invites participants to pin small pieces of paper to a cardboard surface. DIS allows users to send messages through SMS, Twitter and a web-based interface. PTL and DIS allow users to write and publish their feedback or opinion.

The comparative study discussed in this paper aims to identify the situated engagement potential offered by PTL in the context of a highly digitally mediated urban environment such as Brisbane and other similar cities. In this paper we focus on the content and thematic analysis of the data obtained from both tools. This data is used to compare and inform how an engagement tool designed for widely used tangible media, such as paper, through its own affordances can offer different possibilities as a way to support situated engagement in urban public places. This paper discusses the interactions created by the design interventions, PTL and DIS, and how they affect the notion of place. The purpose of this study is to investigate the affordances of physical media, such as paper, and through this, further our understanding for a possible hybrid approach to community involvement, which would include both digital and non-digital alternatives. The knowledge gained from this study contributes to our understanding of a future hybrid approach. In this paper we focus on PTL as a design

intervention that specifically examines the question: how can tangible media support situated engagement? After reviewing related work, we provide an overview of PTL and DIS and present the methods employed in the study. The discussion includes an analysis of user-generated content.

Literature Review

Urban Space and Place

Our world today is constantly flowing (Castells, 1989) and evolving between the physical and digital spaces that we experience through our multiple senses. It is the use of these senses that assist in attaching meaning to space, therefore creating a sense of place (Augé, 1995; Carmona et al., 2010). It is through the intention of creating memorable experiences for people within urban public spaces that PTL and DIS are designed as place-making interventions. By asking participants to reflect on relevant urban issues, single and collective members of the community have the opportunity to construct shared identity symbols (Auge, 1995). Harrison and Dourish (1996) recognise that people create notions of place within digital environments as well as in physical environments. These factors have influenced the creation of PTL and DIS.

PTL and DIS are methods of participatory action research (PAR) for place-making in urban environments (Bilandzic & Venable, 2011; Hearn et al., 2009) which can also be considered as forms of Guerrilla Research Tactics (Caldwell et al., 2013). The aim of PAR is to empower ordinary people and the public in and through the research by creating a socially owned process (Kindon et al., 2008). Therefore, the results of the research are directly informed by the people who are connected to the place of question and often involve the use of research methods using performative methods like diagramming, theatre or video (Kindon et al., 2008). Guerrilla research tactics are a combination of PAR and unobtrusive methods developed to acquire information in situations when attracting participants through traditional methods is challenging. Guerrilla research tactics rely on creative and fun approaches to engage with research participants while focusing on critical social and urban issues relying on local communities to take action in order for solutions to occur (Caldwell et al., 2013). The

design and deployment of our installations expose context specific questions related to place and encourages ordinary people to have their say about local issues.

Situated Engagement

Situated engagement refers to enhancing social interaction and collective participation within a particular locality (Schroeter et al., 2012). Examples of engagement situated in urban public places include: taking advantages of civic engagement opportunities with public screens and mobile devices (Schroeter, 2012); and empowering art practices using mobile devices (Scheible, 2010). These location-centric media channels have been widely recognised to contribute to engage citizens while they occupy local, civic space (Schroeter et al., 2012). Due to the intrinsic qualities of urban public places, interfaces designed for it, should be intuitive and accessible without pre-requisites (Kortbek, 2008). As such, the issue of access is crucial in these places, for instance within a context of community consultation processes or smart city learning. For the purposes of this research, PTL and DIS (Schroeter et al., 2012) addressed situated engagement within such context.

Tangible Media

Digital media and its largely GUI-based approach has been criticised by not offering possibilities to utilise and employ highly developed human physical skills (Ishii, 2008; Ishii & Ullmer, 1997). GUIs and the interactions they offer are usually not consistent with how we sense, manipulate and interact with our physical environment. To address this issue, Ishii (2008) suggests that tangible components should be integrated. Examples of interfaces that have explored these issues in urban settings include mobile media hybrids, using mobile phones for painting on large projections (Garner et al., 2006; Scheible et al., 2008), or remote controlled cars for printing with spray paint text messages on the floor (Applied Autonomy, 1999). However, little is still known about how to design such interfaces, especially how to enable interaction in the context of the city (Scheible, 2010). The research discussed in this paper seeks to address these questions by comparing a paper- and a screen-based urban interface designed to promote interactions within local communities about local communities.

Paper in Prototyping

The field of Interaction Design has been exploring paper prototyping as a means to further understand experience factors, usability issues, aesthetic components and design specification

among others, and the method is acknowledged as a tool that provides strong insights pertaining to the design process (Buchenau & Suri, 2000; Moggridge, 2007; Rettig, 1994; Sauer & Sonderegger, 2009). Within this context, the design interventions discussed in this paper respond to Matthews et al. (2008) by purposefully being site specific in the nature of the questions asked and the location and placement of the interventions. In addition, one of the many implications of the qualities of paper prototyping is that they are considered as transitional, limited in scope, and as such, usually regarded as rudimentary, often falling well short of fully operational prototypes (Sauer & Sonderegger, 2009).

Current research has shown that when compared to everyday digital devices, paper's affordances could be unique in per se. Takano et al. (2012) explore how current digital technologies (i.e. laptop PC and iPad) compare to paper, and state that they might not be the best media to use when discussion and exchange of knowledge need to take place. Analysing the role of paper in an interactive environment and how people handle it, can offer clues into what could be explored with paper-based interfaces and their alternative uses (Takano et al., 2012). By identifying when paper prototyping is better suited for communicating with others, its use can go beyond the temporary and ephemeral through the possibility of using it as the final product for use in human-computer interaction designs.

Paper has physical and tangible qualities that affect the ways in which people perceive and interact with it. Such formal and tangible qualities are; being tactile, having a smell, and producing sound when touched, all of which attracting the human senses and producing an affectionate connection to paper. Due to these physical qualities of paper it is flexible in its use where it can be physically moved, used creatively, folded, filed, and manipulated. The design of PTL continues to explore the opportunities and possibilities for the use of paper as an affective interface in an urban setting. The results of the research discussed in this paper continue to investigate how people perceive the value of paper.

Methodology

Based on the work of Lentini and Decortis (2010), this study makes use of a mixed method approach, which includes participant observation, content analysis, and thematic identification. The main focus of this study was to empower users through responsibility and

value, eliciting face-to-face interactions and favouring rich collective experiences between users (Lentini & Decortis, 2010).

Tangible Design Intervention: Print + Talk = Love



Figure 34. An image of Print + Talk = Love at the Changing Lanes event May 2012

PTL (Figure 34) is a situated paper-based design intervention composed of a large piece of corrugated cardboard and pieces of paper with printed questions. Several coloured pens are clipped onto the cardboard attached by strings. A series of small pieces of paper are pinned all over the board right from the beginning. Each paper has a question addressing particular issues related to each event and blank space providing participants with room to write their answer to the question. The simplicity, ease of use, and rapid assembly are key design factors allowing the opportunity to both the researchers and participants to engage with it in multiple ways. Due to the tangible qualities of paper discussed earlier, participants are able to personalise the papers by using different colours or types of writing to emphasise their comments. Due to the tangible qualities of paper discussed earlier, participants are able to personalise the papers by using different colours or types of writing to emphasise their comments. Participants are able to take the papers off the board or change their location.

They can tear or manipulate the paper however they like. For the researchers the design of PTL is flexible in its ability to adapt to the place of implementation through changing its location because it is independent of electricity. Through observation the researchers can adapt the board to engage with co-located people. These factors are critical to the design, as one of the requirements for situated engagement is to provide a low entry barrier with nearly no pre-requisites. Deployment considerations include defining a suitable installation space, visibility, content, and how the pieces of paper are made available to those interacting with PTL. Once deployed, the board is positioned and fixed so that it is self-supporting and self-contained. As a result, the research team can make unobtrusive observations from afar.

Digital Design Intervention: Discussions in Space



Figure 35. An image of Discussions in Space at the Changing Lanes event May 2012

Discussions in Space (DIS) (Figure 35) is a situated interactive screen application for urban public places aiming to engage with local citizens about local civic issues (Schroeter, 2012; Schroeter et al., 2012). The screen presents a topic and a set of questions. Users are invited to directly provide their comments and feedback while being in front of the screen by either SMS texting or tweeting. An optional real-time moderation backend ensures that messages are appropriate before appearing on the public screen. Incoming messages appear in a dynamic and animated way, changing and shifting to grab attention and encourage

engagement from the public audience. DIS is a highly successful¹ application that has been deployed in a number of public venues and events including Federation Square in Melbourne, the State Library of Queensland in Brisbane, and as a public participation tool within a real-world urban planning project.

There are many external parameters that influence the uptake and success of such public screen applications including location parameters such as the nature of the installation space, but also the positioning of the screen, its size, etc.; people parameters such as the demographic, age, technology affinity; and content parameters such as whether it is specific or general, fun or serious, or contextualized to the environment or not (Schroeter et al., 2012). However, if the sweet spot is hit within those parameters, the application has demonstrated to engage with young citizens that would otherwise not have their say (Schroeter, 2012) and collect useful urban planning related data that is different to data collected through more common public participation tools (Schroeter & Houghton, 2011).

Context

New mechanisms are needed to offer additional benefits for civic participation beyond the standard tools proposed by Hornecker and Buur (2006), in particular to give voice to those who otherwise would not necessarily be heard within local communities (Schroeter et al., 2012). In order to explore these new mechanisms, we examine the contribution of PTL and DIS as urban interfaces that promote community interaction and engagement. Both were deployed at the same time during two public events in Brisbane, Queensland: Changing Lanes and Grey St. Exchange 2.0.

Case Study 1: Changing Lanes

Changing Lanes was a laneway party held on 25 May 2012. This public event was organised by a local design community, and supported by a local university. The target audience was predominantly university students among the local community. The purpose of the event was to stimulate and activate a local laneway through the involvement of experts in design disciplines. The event also featured a range of student built street furniture installations, student design work on exhibition, digital projections, a DJ, food and beverage stalls. Approximately 500 people attended the event.

PTL was positioned between one of the food stalls and the main stage, in an illuminated section of the laneway. By being located in between highly active areas of the laneway, attendants encounter PTL regularly. During this event, the PTL board was accessible to the public from 6pm to 12am.

In parallel to PTL, DIS was displayed on a big, white wall using a data projector. It was a typical 'event screen' installation, where the screen is not permanent but part of a temporary event (Schroeter et al., 2012). The screen was located nearly at the end of the laneway, next to the main stage and food stalls. It was highly visible and was facing the crowd. The moderation tool was not active during this event, so all messages appeared on the screen unfiltered. Both PTL and DIS ran the same question, asking to complete the following sentence: *Brisbane Laneways need more...?*

Case Study 2: Grey St Xchange 2.0

The Grey St. Exchange 2.0 exhibition was co-hosted by a local university along with South Bank Corporation on 2 November 2012. The purpose of the exhibition was to showcase student design work to the local community. At the opening night of the exhibition, there was live music and approximately 100 people in attendance. The exhibition was open to the general public over the weekend and attendees ranged widely in background and age.

The PTL board was set up and accessible to the public from 5pm Friday 2 November to 4pm Sunday 4 November. PTL was located to the left of the entrance of the shop where the event took place, facing the street. The comments and written notes were left on the board throughout the entire exposure of the board. DIS was installed via a small 40 inch LED TV mounted on a wheeled cart, slightly above eye-sight. During the opening evening, the TV was positioned outdoors to the right of the entrance of the shop facing the street. The screen was bright and highly visible. During the remaining four days and nights, DIS was located indoors behind a glass window facing the street, therefore less bright and visible during the day.

PTL and DIS asked the following question: *What is your Great Idea for Grey Street?* The purpose of having the same question on both PTL and DIS was to enable the research team to compare the results between the digital responses received via DIS and the handwritten

responses on PTL. Both questions were intentionally formulated to address and engage participants with issues relating to the specific places of the installations.

Observations: Throughout the time of the installation at both locations, Changing Lanes and Grey St. Exchange 2.0, the research team unobtrusively observed participants and photographed the design interventions.

Interviews: Initially the research team expected to interview PTL participants after having written on a piece of paper. This however was a difficult task as it became clear that participants did not want to speak with the research team. Participants did not answer the email call for interviews. Alternatively the research team distributed an anonymous online survey to potential participants of the PTL installation.

Surveys: As PTL is a new design intervention, a survey targeting its users took place. It included seven questions of which one set was about general information about occupation, age, location where interaction took place, and another one about how participants understood PTL as an interactive installation, the differences between texting and writing on paper, and content. Unidentified participants answered 5 surveys. This survey did not include questions about DIS because there is existing data regarding its deployment in other locations, see (Schroeter, 2012; Schroeter et al., 2012).

Analysis

The analysis of acquired data borrowed grounded theory techniques where information was categorised into commonly occurring themes.

Observations

As with DIS (Schroeter et al., 2012), it was observed that location and positioning of the installation affects the interaction of participants. High visibility is critical to the success of the installations. During both of the case study events, Changing Lanes and Grey St. Exchange 2.0, people showed interest in PTL by stopping to have a look at the papers. Mostly, people would only read what others had posted rather than post themselves.

Some people seemed reluctant to approach PTL and write on it, and some asked for permission to write. This indicates that it was not clear what was expected of people to do

with PTL. For subsequent iterations it is critical to make it clear that people are encouraged and expected to write something on PTL. If there were more than one or two people standing at the board other people would not approach it. Participants were not interested in being interviewed, they simply wanted to engage with the board and move on.

In regards to DIS, in Changing Lanes the projection was highly visible, and received a large number of messages. In Grey St. Exchange 2.0 DIS was deployed on a TV screen, behind a window. People did not seem to acknowledge the screen, and ignored its content throughout the whole event. Schroeter et al. (2012) refer to the ideal situation where the system not only collects a relevant number of messages, but also good quality messages, or messages within topic, as the sweet spot.

Survey Results

The survey shows that most participants were able to identify different benefits that could be obtained from PTL in comparison to DIS, including generating interest and user engagement in connection to the place where each installation was deployed. In relation to how participants perceived PTL, respondents indicate that it presented opportunities for exploring different aspects of participation in the redefinition of urban public places and reflecting about location, as shown in the following comment: “[PTL] Asks you to reflect on the space, it makes you really take conscious of the surroundings...” – P2.

Furthermore, by providing immediate access to all previous comments from other participants, it is acknowledged that feedback under these circumstances was fluid and effective. Users enjoyed reading what other people had to write. The notes from other people seemed to have affected the tone or content of users who wrote on the board. “*I read them and they were a good prompt as to the topics I should be writing about,*” – P2. “*I was one of the first that wrote on it but I definitely looked at the couple of other answers that were on there.*” – P3.

Participants reflected on the experience of writing on a piece of paper versus texting or tweeting. In comparison, both texting and writing are considered to have social implications, or individual implications. “*Texting has this implication of social construct... it’s something you do for social reasons and social engagement... typing is something a lot more formal*” – P1.

The tangible aspect of PTL is considered as a significant feature, not only by providing a means of detaching comments from one's own identity, but also by providing a sense of intimacy and familiarity. *"(writing is) more intimate and (I) feel like a 'real' person will read what I write," – P4. "(writing) seems to have more meaning than sending a tweet to a digital screen," – P2.*

The following comment depicts how participants understand and assess issues of privacy and engagement with others. *"...I'm hesitant to interact with unfamiliar sources using social media (Twitter or Facebook) due to privacy and security concerns... (Paper) can no longer be traced back to me, and I think that allows people to leave more meaningful and truthful interactions." – P2.*

The notion of a statement remaining in time is also mentioned, showing how participants think about the temporality or permanence of their messages in relation to tangible or digital media. *"...[typing] can exist virtually and forever if you want it to...a piece of paper lasts for as long as its maintained...[because of] its formal and a physical stature..." – P1.*

In some instances it is noted that due to its uncommon appearance, PTL is perceived as a peculiar intervention. The atypical format of PTL, and consequently how it was perceived was twofold. The advantages offered by it prevail over its disadvantages, but it is also worth mentioning that a number of access barriers are described. The most significant factor and barriers are; the location of the intervention, hesitancy of writing on it, a lack of something to say and not fully understanding the purpose of it, which is consistent with DIS previous findings (Schroeter, 2012). *"I felt, a little underwhelmed and a little unsure exactly of what was going on and what it was for," – P5. "The general location, design, aesthetics of the PTL (along with the rain on the night) made it feel not so engaging." – P5.*

Discourse Analysis

PTL collected a total of 85 handwritten pieces of paper during Changing Lanes, and 78 during Grey St. Exchange 2.0. DIS on the other hand collected 164 messages during Changing Lanes, most of them through Twitter and SMS, and only 5 during Grey St. Exchange 2.0 through SMS texts. All of the written notes collected at Changing Lanes and

Grey St. Exchange 2.0 from PTL and the texted or tweeted comments from DIS were transcribed and thematically coded in the same manner. The first obstacle was to filter the comments by classifying them as either spam or thoughtful comments. Spam comments were considered to be either offensive or inappropriate.

In PTL the number of occurrences of spam messages was considerably lower than in DIS. During the Changing Lanes event, PTL collected a total of 85 handwritten pieces of paper with 37 of them considered spam (43.5%). At the same event, DIS collected a total of 164 messages with 118 of them being spam (72%). Both PTL and DIS had similar numbers of thoughtful messages with 48 in PTL, and 46 in DIS. However, these numbers dramatically changed during the Grey St. Exchange 2.0 deployment. 20 out of 78 paper pieces (26%) had spam messages in PTL, and 4 out of 5 (80%) messages were spam in DIS. Focusing only on the thoughtful comments left by participants, the thematic coding placed comments into categories based on similar topics. The following describes the main topics for each design intervention at each location.

Case Study 1 Results: PTL at Changing Lanes

The question that was proposed to the public through both PTL and DIS during the Changing Lanes event was: *Brisbane Laneways need more...?* The most frequent topic that was written about by participants was categorised as Urban Conditions. This topic includes the role of urban design in addressing local interests and the vibrant aspects of local urban features, e.g.: *“We need more indoor/outdoor spaces not replicated laneways,” “Lighting.”*

The second most frequent topic was Entertainment, which includes expression channels, cultural outlets, and sports, e.g.: *“Personality, outlets 4 input like this, street art,” “Art & cafes, music,” “Interactive artwork and cute cafés,” “Laneway Parties!” “Ragtime and swing (dance),” “Interpretive dance and flashmobs,” “Energy,” and “Sports!”* Food and drink was the third most common topic. Participants mentioned cafés, temporary street food carts and other food-specific preferences, e.g.: *“Soup carts!” “Cozy cafés,” “Pop-up bars,” and “Ice-cream.”* Other comments cover such things as local government related issues and retail.

Case Study 1 Results: DIS at Changing Lanes

The majority of the comments that were received by SMS or tweets through DIS is related to the actual event and did not necessarily answer the question that was being asked. Most

messages received are related to the excitement of the night. It can be inferred from the examples below that the event was energetic and lively, and that most people who submitted a message to DIS were enthusiastic about the event: *“Awesome stuff at #brislanes,”* *“#brislanes this is cool!”* and *“#brislanes congrats new market well done.”*

Urban conditions had the next highest amount of comments. 50% of the messages related to the rainy weather conditions of the day, and the others related to the design of the urban environment including shelter or traffic restrictions amongst others. Food and Drink was also a frequent topic.

Case Study 2 Results: PTL at Grey St. Xchange 2.0

During Grey St. Exchange 2.0, PTL and DIS displayed the following question to the public: *What is your Great Idea for Grey Street?* The purpose was to obtain information from local stakeholders as to what they considered to be great ideas for Grey St. There were 58 thoughtful written comments. The most frequent category was entertainment, with 19 comments. Within it, art and culture were prevalent: *“More concerts, free.”* Also within that category, there were many comments that mentioned a range of activities including city-specific, season-specific sports, and others: *“Parkour Park,”* *“Skateboarding area,”* *“Ice-rink, street entertainment.”*

The second most frequent topic was focused on facilities. Free parking appears to be a big issue at a place such as South Bank, which is often busy on weekends. The third most common topic was urban conditions: *“Improved lighting,”* *“More child friendly furniture and areas.”*

Food and drink and shop hours together gathered a good number of comments, and this is probably related to South Bank’s well-known nightlife: *“Dinner after 10pm please,”* *“Shops open at night.”* Six participants commented on gardens and parks. Most of the comments respond to the needs of families and young children reflecting the type of people who live or spend time in South Bank: *“A playground!”*

Case Study 2 Results: DIS at Grey St. Xchange 2.0

DIS only received 5 comments in total throughout the Grey St. Exchange 2.0 event. Comments regarding the opening hours of restaurants and shops was most frequent: “24/7 shops!” Similar to PTL there was a comment regarding free parking, and one comment about the urban conditions of South Bank.

Discussion

The written comments left on the installation by participants supplement our understanding of the effectiveness of the installation in creating a memorable experience for participants. When examining the content of the comments left by participants in both PTL and DIS it is critical to reflect on the nature of the questions that were asked during each iteration of the installations. Both of the questions asked passers-by to directly respond to the urban environment in which the installations were placed, explaining why the category of urban conditions occurred across both installations at both events.

Common to PTL at both events was the category of entertainment including arts, culture, and activities, which did not arise in DIS. However, it is expected that the entertainment category would be commented on in both installations due to the nature of the events. Both events included a DJ or live music, and had similar demographics of people such as university students in addition to the local public. Perhaps this unexpected finding correlates to how people perceive a difference within the act of writing on paper versus typing a text or a tweet. In one of the quotes from the survey the participant makes a remark about how writing on paper embeds a higher interactive complexity: “*It [writing] is more interactive,*” – P3.

Due to the fact that the category of entertainment was only common to PTL we can begin to distinguish the quality of comments left by participants between PTL and DIS. Because PTL is a physical installation with a tangible presence people perceive it differently than DIS in a way that is more intimate, and provides room for reflection. When examining the survey responses regarding the tangible experience of writing versus typing, it becomes clear that people had mixed understandings of the anonymity and temporal or permanent factors of writing on paper. One respondent believed that writing on paper was more anonymous than typing and this affected the type and quality of answer that participants would leave behind, as can be seen in the following quote: “*Once I’ve pinned the piece of paper to that board it*

can no longer be traced back to me, and I think that allows people to leave more meaningful and truthful interactions,” – P2. The meaning of permanence and how people interact with paper versus digital media affects how they interact with PTL and DIS.

When comparing comments left on PTL and DIS it is clear that DIS received a lot more spam than PTL. Even though anonymity in PTL is readily available, it seems that self-regulation is exercised to a greater extent, which could explain the lower ratio of spam messages. The possibility to freely engage and write in public spaces is rarely offered, and the disruptive approach could be conflictive. However, the results show that it is well received.

Another difference between the types of comments and the ways in which participants used PTL and DIS during Changing Lanes is found when examining the main category of event related for DIS. PTL is only available to co-located users and participants. Because DIS receives comments from Twitter, it has the ability to communicate with others beyond the physical location of the installation. It is apparent that DIS users at Changing Lanes were attempting to communicate to a larger public, and engage them in Changing Lanes activities, or at least acknowledge them: *“Changing Lanes at Fortitude Valley is now open! #brislanes is happening.”* Some comments include links to photographs where users show aspects of the event to others on their digital networks.

Conclusions

As a result of an increased number of readily available digital products and media in recent times, more and more digital interfaces mediate how we interact with each other (Dunne, 2006) and the urban public spaces we inhabit. A large body of research has inquired how digital interventions can extend and engage people in urban contexts, but has overlooked the potential of exploring well-known techniques that could stand on their own. We have examined and compared a physical and tangible intervention versus a well-tested digital one. The results indicate that both types of installations can be affective means of engaging with public communities. The purely physical installation has its benefits and drawbacks, as does the purely digital.

From this study we can conclude that PTL was successful in two areas. First, PTL was successful in creating situated engagement, which is attributed to its tangible qualities and

abilities for participation, adaptation, and appropriation (Harrison & Dourish, 1996) therefore creating place. Second, PTL proved to be a valuable tool for acquiring data on urban issues from local participants and can be considered as a meaningful participatory design method in urban design, planning and possibly other disciplines related to urban public spaces.

Both deployments were highly successful in regards to data gathering, however, data gathering after the events was difficult. A call for interviews was sent out to local networks of people that attended both events, but was unsuccessful in gathering any interest. A further questionnaire was sent out, and even though was answered by only five people it provided the team with enough material to work with. In further deployments, the research team would like to interview participants in-situ, as the results show that participants are interested in maintaining their anonymity. Furthermore, by elaborating on Schroeter et al.'s (2012) sweet spot and re-purposing it, further deployments of PTL could be fine-tuned.

The merit of this study is to emphasise the affectiveness and the affordances of tangible and physical installations when attempting to create situated user interfaces for urban public places. In this context the following question arises, how can these differences be mediated and integrated to create a hybrid approach addressing the merits of both the physical and the digital? We argue that the future of situated engagement can no longer be purely digital or purely physical, there is a need for elements of both to be integrated to maximise the effectiveness of future tools. The features of these future interventions should include a low entry barrier by integrating a familiar data input across a range of users, ways to effectively protect the identity of the participants, offer the possibility to access other participants' messages, provide means to reach out to people and communities beyond co-located users, but at the same be intimate enough to keep co-location relevant.

4.3 Summary

The papers in this chapter present the findings from two initial design interventions #1 & #2 which acted as pilot studies. These early design interventions were a critical part of this research as they allowed for the exploration of ideas and methods to occur with other researchers from different disciplinary backgrounds, participants, and within public spaces. The main aspects from both design interventions #1 & #2 which were carried forward to design intervention #3, was the idea that it was possible to use design approaches to create “creative catalysts” causing participants to reflect on their own experience of place and what that meant to them. The ability to draw as shown in design intervention #1, provided participants a different form through which they could communicate and express their understanding of the places they value within their everyday lives. Design intervention #2 which compared a digital screen with a cardboard version, each with the same purpose of conducting situated community engagement, revealed that the different media (digital vs. analogue) each had their own merits and challenges. Ultimately this led to the conclusion that a hybrid approach which provided both digital and analogue media would be most suitable to attract the engagement of more people from different parts of society.

The papers in this chapter present the first two design interventions highlighting the aspects that worked well. However each of them had their limitations which also needs to be addressed. Similarly both design interventions were conducted over a short amount of time, they are not longitudinal studies in any way and this is perhaps their biggest limitation. Also they were conducted within a narrow context and narrow scope. The findings of the design intervention #2 suggest that both the digital and the paper based interactions were equally important however in actuality the digital aspect was much less effective in that there was far less engagement with it than the paper based one. The paper does not discuss the limitations of the study in depth and upon reflection it is important to acknowledge this discrepancy. Had the intervention been repeated over longer periods of time in more diverse locations and contexts the findings may be different however from my experiences with the three design interventions and previous research I would expect not. Although we, as a society, are generally fascinated with technology these small studies begin to indicate that actually people tend to be much more drawn to paper based and tangible interactions. There are many possible explanations for this, perhaps people feel overwhelmed or saturated by technology,

its easier to just write or draw on paper, people can express themselves and their individuality on paper that is not possible through screens. This aspect of the research could be investigated further however it was not a focus of this thesis yet it strongly influenced many of the design decisions that follow. In the next chapter design intervention #3, the InstaBooth continues to build on a hybrid (digital and analogue) approach to creating situated community engagement.

Chapter 5: Design Intervention #3...The InstaBooth

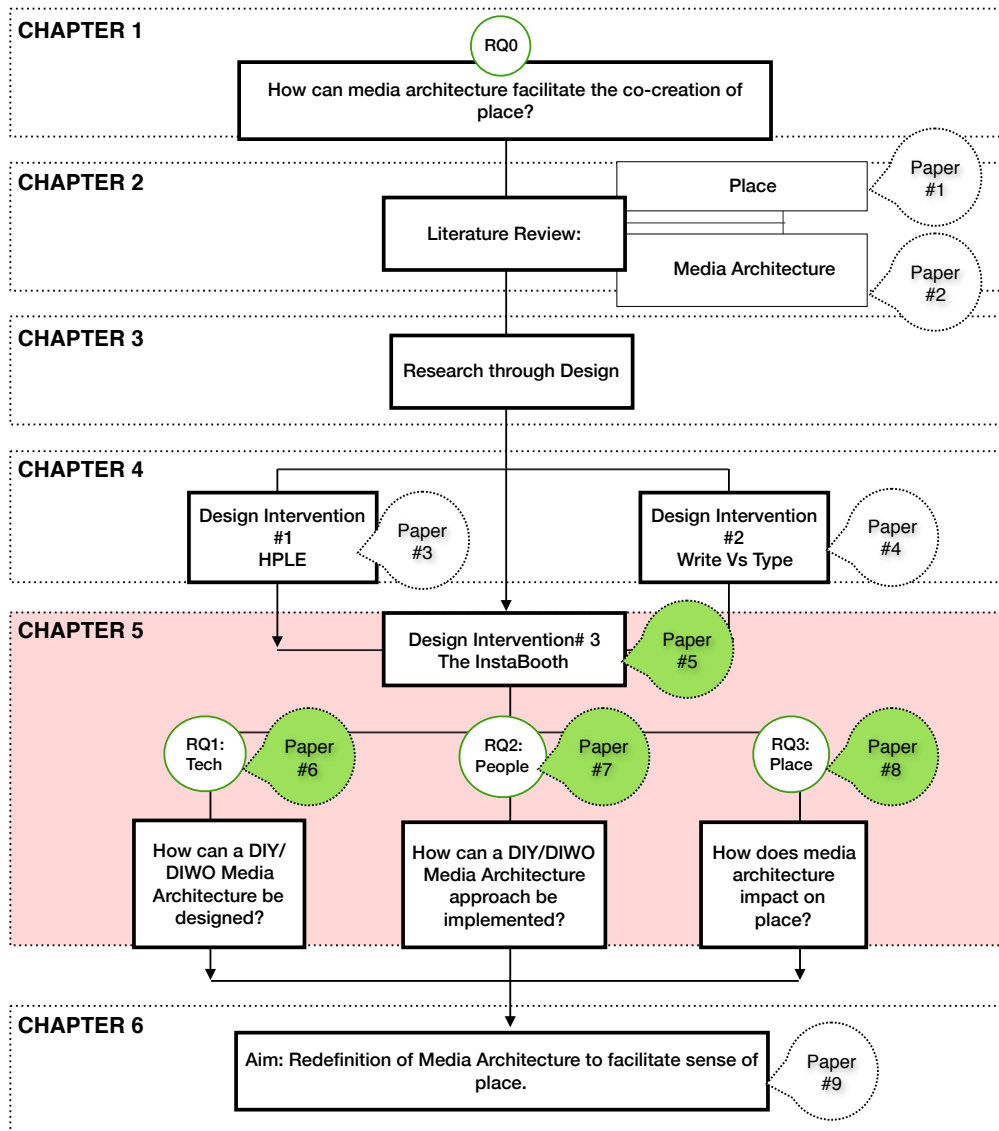


Figure 36. Way-finding Diagram of Chapters

Chapter 5 presents the design intervention #3, the InstaBooth which became the main study of the thesis. Figure 36 indicates the composition of chapter 5 which includes four papers (#5-8). Paper #5 provides an overview of the InstaBooth project with a set of guidelines that were composed based on a review of other similar situated and hybrid community engagement projects from around the world. Papers 6, 7, & 8 address the different research questions revealing how the InstaBooth was designed, implemented and assessed.

The learning and inspiration gained from completing design interventions #1 & #2 provided valuable insights towards the development of design intervention #3, the InstaBooth. The

main factors from design interventions #1 & #2 which informed the design of the interactive capacity of the InstaBooth was the critical role that different types of media played in engaging different people to communicate through drawing, writing, or texting/tweeting. In terms of the broader research agenda to explore the co-creation of place, design intervention #3 allowed the opportunity to test the theories developed around hybrid place, creative catalysts, and DIY/DIWO media architecture. These theories guided the design process, the implementation, and analysis of the InstaBooth and how it impacted on local communities as discussed in the following sections.

The InstaBooth project was enabled through a QUT Engagement and Innovation Grant awarded in 2014, entitled “Recording the Past - Designing the Future: The InstaBooth for Situated Community Engagement”. I was the lead investigator on this grant heavily supported by a trans-disciplinary group of researchers, students, colleagues and stakeholders.

5.1 Defining the InstaBooth: Facilitating Debate and Content Creation from Situated Users

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 5.1:

Johnstone, Sarah, Caldwell, Glenda Amayo, & Rittenbruch, Markus (2015) Defining the InstaBooth: Facilitating debate and content creation from situated users. In *MediaCity 5*, 1-3 May 2015, Plymouth, UK.

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDAL CALDWELL	Significant contribution to the planning of the paper, literature review, and assisted with the preparation and evaluation of the manuscript.
SIGNATURE	
DATE	18 July 2016
SARAH JOHNSTONE	Significant contribution to the planning of the paper, literature review, and assisted with the preparation and evaluation of the manuscript.
MARKUS RITTENBRUCH	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript.

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

This paper was jointly written with Sarah Johnstone and Dr Markus Rittenbruch. In the summer of 2014-2015 Sarah Johnstone worked on the InstaBooth project under the supervision of myself, Markus Rittenbruch, Jared Donovan, Mirko Guaralda, and Marcus Foth through a vacation research experience scholarship (VRES) provided by the Creative Industries Faculty. As part of her research experience she assisted in conducting a literature and case studies review which informed this paper. Sarah, Markus and I collaborated on the writing of this paper which included the development of ideas, the paper structure, revisions and editing. I presented the paper in addition to including a scaled model and poster of the InstaBooth in the exhibition at the MediaCity 5 conference 2015 in Plymouth, UK.

Preamble

This paper examines literature and case studies to assist in defining and positioning the InstaBooth project across other similar design and urban interventions that have been occurring across the globe. A set of guidelines for the InstaBooth design, its interactive components, and community engagement approach was developed.

Johnstone, Sarah, Caldwell, Glenda Amayo, & Rittenbruch, Markus (2015) Defining the InstaBooth: Facilitating debate and content creation from situated users. In *MediaCity 5*, 1-3 May 2015, Plymouth, UK.

Introduction

Through ubiquitous computing and location-based social media, information is spreading outside the traditional domains of home and work into the urban environment. Digital technologies have changed the way people relate to the urban form supporting discussion on multiple levels, allowing more citizens to be heard in new ways (Caldwell, Foth, & Guaralda, 2013; Fredericks & Foth, 2013; Houghton, Foth, & Miller, 2013). New display technologies such as large multi-touch screens and media façades as well as interaction modalities such as gestural and tangible interaction have enabled new ways engaging citizens in face-to-face and digitally mediated discussions. In our research we are exploring the design of a portable community engagement platform, inspired by the telephone booth: *The InstaBooth*.

The *InstaBooth* employs a multidisciplinary approach to engage local communities in a situated debate on the future of their urban environment. With it, we capture citizens' past stories and opinions on the use and design of public places. The *InstaBooth* provides an engagement and discussion platform that leverages a number of bespoke display and interaction technologies in order to facilitate a dialogue of ideas and commentary. The *InstaBooth* blends multiple digital and analogue interaction modalities into a hybrid community engagement space. Through the *InstaBooth*, urban design and architectural proposals are displayed or civic ideas are presented, encouraging commentary from visitors. Inside the *InstaBooth*, visitors can activate a range of interaction mechanisms in order to browse media, write a note, or draw a picture to provide feedback. The purpose of the *InstaBooth* is to engage with a broader section of society, including those who are often marginalised.

The specific design of the internal and external interfaces, the mutual relationship between these interfaces with regards to information display and interaction, and the question how visitors can engage with the system to create content, are part of the research agenda of the project. To inform the design and fabrication of the *InstaBooth* this paper examines existing

literature in the areas of *Placemaking*, *Participatory Design*, and *Community Memory*. It seeks to uncover what research has been carried out on the use of new media technology as a tool in the planning process of our cities and the various ways it negotiates with the typical issues mentioned that are beneficial in the design of the *InstaBooth*. To supplement that position we also provide a contextual review of small-scale urban interventions across the globe. As a result of the review, a taxonomy has emerged that includes projects falling under four main categories: *Memory Collectors*, *Community Consultation Tools*, *Communication Facilitators* and *Performance Generators*. From this analysis a set of guidelines have been devised which have assisted in shaping the interactive components, the design and material qualities of the *InstaBooth* and its engagement strategies. The *InstaBooth* project fosters innovation by providing pathways for communities to participate in the decision making process that informs the urban form. The *InstaBooth*, an urban intervention, promotes dialogue and mediation between a bottom-up and a top-down approach to urban design, with the aim of promoting community connectedness with the urban environment.

Placemaking

The way public consultations are currently done often engages only a section of the population involved in a proposed development; the more vocal citizens are not necessarily the more representative of the communities. There is evidence in the field of research on community engagement to support the assumption that until recent times, the obligatory nature of the urban planning industry to include public participation, have resulted in “symbolic participation” that seldom extend beyond the act of ‘selling’ a final pre-determined proposal at the end of the design process (Golobic & Marusic, 2007).

However, there is growing support for involving the public to help find common solutions for their community, rather than merely exposing them for their opinions (Golobic & Marusic, 2007), and ultimately providing them with opportunities to go beyond the top of the third “ladder” (Arnstein, 1969) to achieve different levels of public empowerment (Golobic & Marusic, 2007). Alternative ways to engage urban dwellers in the debate about the built environment are currently explored, including the use of social media or online tools (Foth, 2008). Our research suggests that there is still areas for improvement particularly in the areas

of mediation between the general public and experts, and that technology has been outlined as being helpful as a methodological tool for the integration of lay knowledge into the design of “user conscious proposals” (Golobic & Marusic, 2007).

The topic of placemaking is central to that of engaging community in discussion about the design and planning of their public spaces and most research on the topic can identify the benefits of using a community’s assets for the creation of socially sustainable spaces that have a positive impact on the community. Whilst the term ‘Placemaking’ has gained popularity in recent decades, it initially gained traction during the 1960’s by influential writers in the field of urban design such as Jane Jacobs, and then later by architects such as Lucien Kroll. Whilst the term signified something that had always existed amongst communities, it was an important part of recognising that designing around a larger vision for a particular place, in order to have greater meaning for those that live there, cannot be done in isolation of the community itself. The writings of Jane Jacobs and her fellow peers, have cultivated a long list of research into this area, which has translated in the actualisation of its growing popularisation in urban design projects to date. In fact, “there is a growing movement amongst urban planners to utilise creative community narratives in the process of urban planning” (Foth et al., 2008). More than just an idea, placemaking can also be looked at as a hands-on tool, which is rooted in community-based participation (PPS, 2015). In research carried out by Foth et al., it is suggested that when combining public history and art with storytelling, a process of place construction can occur which can be helpful in making visible, previously forgotten parts of the city (2008).

Participatory Design

Whilst the definition of ‘Place’ and ‘Placemaking’, are fairly recent terms in the overall scheme of design, the concept of ‘Participatory Design’ made its way onto the scene far earlier. Italian architect Giancarlo De Carlo was active during the post-war Italian anarchist movement and heavily advocated “participatory architecture”. He was one of the first renowned architects to consider architecture as a consensus-based activity, viewing his work as being ‘impregnated’ with the anarchist ideal of “active freedom,” of accomplishing things “without exploiting our power” (Graham, 2009, p.95). Lucien Kroll was another regarded architect to pioneer the concept of Participatory Design. He was one of the first to suggest

that the role of an architect should not have sole responsibility over a project, but that their knowledge should be available to everyone and be applied to the role of facilitator, working directly with the future users, in what is described by many today as a participatory process (Milgrom, 2002, p. 91).

Participatory Design has a similarly long tradition in the context of designing work environments and computer systems rooted in Scandinavian approaches (Bodker & Pekkola, 2010; Muller, 2003; Muller & Kuhn, 1993). This highlights one of many aspects bringing together disciplines related to the built environment, such as architecture and urban planning, with disciplines from the information technology field. Although the materials in which these disciplines work or quite different the theories behind their development overlap and relate to one another. There is theoretical support in favour of learning from users in order to determine outcomes that would be most appealing to them. This is typically referred to as ‘User-Centred Design’ (UCD), or the preferred term ‘Human-Centred Design’ (HCD) according to Steen, which concerns itself with ‘people’ rather than the dehumanising reference to them as simply a ‘user’ (2011, 46). According to Steen, there are two main tensions of human-centred design that HCD practitioners need to address; the first tension is the perceived need to combine and balance the human’s knowledge and ideas with that of their own, whereas the second relates to the need to combine and balance the practitioners concern for understanding current or past practices with concern for envisioning alternative or future practices (Steen, 2011, p. 47).

Furthermore, in research carried out by Steen, it was identified that there are six approaches to HCD: (1) Participatory Design; (2) Ethnography Design; (3) Lead User Approach; (4) Contextual Design; (5) CoDesign and (6) Empathic Design (2011, 48). In his research focusing on tensions of human-centred design, Steen identified the various ways these different approaches cope with these two tensions. According to Steen, it is the intention of Participatory Design to give potential users a role in design, evaluation and implementation (2011, 49). Many would agree with the notion that participation is in itself a barrier to Participatory Design as “Participation is difficult human behaviour to accommodate since every person and every situation is unique,” (Jakovich, Beilharz & Echanove 2006, p. 249). However Greenbaum and Halskov not only view Participatory Design as a way to get ‘the

job done better', but believes it to be a way to better "facilitate communication and cooperation between people with diverse backgrounds" (Greenbaum & Halskov 1993, p. 47). According to Steen, through a process of Participatory Design, users could be seen as experts in act of mutual learning with designers and planners who could benefit from the (tacit) knowledge of users into the research and design process (2011, p. 49).

Research carried out by Golobic and Marusic indicate that the main reason for a lack of trust in the general planning process is a communication gap between experts and the general public and a "lack of methods to provide an adequate interface and balance between democratic decision making and scientific expertise" (Buchecker et al. quoted in Golobic & Marusic 2007, p. 994). However, of the known methods of integrating lay knowledge, while preference surveys and public opinions polls are a popular choice for accessible public attitudes, they offer limited information and are "often superficial, ambiguous, and stereotypical" (Golobic & Marusic 2007, p. 995). In the research, Golobic and Marusic do however acknowledge that these methods are effective at acquiring existing local knowledge and "insight into a community's social structure, attitudes, and value orientations" which should be useful for planners to prepare more 'user-conscious proposals' (2007, p. 995).

Interestingly, in the paper by Golobic and Marusic computer models were suggested as a possible connecting step in the process of coupling lay knowledge with expert knowledge and focusing debate by transforming "respondent's written opinions and their cognitive maps into suitability models...to be a promising route towards establishing a common language between experts and the public" (2007, p. 1008). "Participation is both a product and a requirement of the interactive systems...operating in symbiosis with the process of design" (Jakovich et al., 2006 p. 250). "An important product of this theory is the idea that cities can be programmed, or guided, using a bottom-up distributed approach, rather than planned using a top-down, geometrically determined method" (Coward & Salingaros, 2004). This bottom-up distributed approach acknowledges the role of the community in the production of urban space and promotes it, by including it into the decision-making system guiding city planning. "An important strategy is to engage and adapt existing systems of the city upon which to build a participation infrastructure," (Jakovich et al., 2006).

Performative Interactions and Community Memory

According to Foth et al. (2008), new media tools such as digital storytelling may be valuable in community engagement processes. Research needs to explore how community narratives in the form of, for example, public histories of situated experience, can be integrated into current and future practices to value and embed the depth and meaning of people's experiences into the systems and process of ongoing city planning, development and policy making (Foth et al., 2008). Acknowledging the past of places and the roles individuals have in creating and preserving those histories is a critical element the InstaBooth attempts to address in its interactive design.

Through the process of engaging with the InstaBooth or performing the interactions, participants become performers who can be observed by others in the public urban space. Upon performing, the future identity of the performer now includes the performance, the performer can use the present to reflect on the past in order to shape the future (Spence, Andrews, & Frohlich, 2012). It is this process of recording the past to identify the present and explore the future of our cities that the InstaBooth attempts to address in the composition of its interactions.

A case study carried out by Agostini et al. of a city whose identity was being diminished by tourism identified that, "Quality of local community depends on its ability to keep its memories alive through social interaction within the community itself" (Agostini, De Michelis, Divitini, Grasso, & Snowdon, 2002). Agostini et al. claim that Community Memory, the body of knowledge about local communities and neighbourhoods, which individuals share with others, is a key asset of community livelihoods (2002). Due to the decline in social interactions within neighbourhoods the Community Memory is endangered (Agostini et al., 2002). They identify a process to support knowledge creation and sharing of memories to have four steps: 1. Facilitate Content Collection 2. Enhance Information Representation 3. Support Knowledge Dissemination 4. Allowing Content Enrichment. Agostini et al. claim that when all four steps take place and all community members have the opportunity to participate in memories, appropriate them again, this promotes a learning process that can involve the whole community (Agostini et. al, 2002). Klaebe's recent research regarding digital storytelling supports Agostini et al.'s claims by acknowledging that

public history projects are often as much about capturing the ‘ordinary’ person’s reminiscences and anecdotes and thereby engaging the present community, as they are about capturing an objective appraisal of the past (Klaebe et al., 2007). Digital storytelling is an amplification of traditional oral history interviewing method that offers engaging insight into collective social history. It is an opportunity for communities to share their narratives in a ‘glocal context’ (Klaebe et al., 2007). According to Yoko Akama, artefacts can also be used to illuminate knowledge amongst collaborators, which in the context of the *InstaBooth* could be collaborative storytelling amongst the local community (Akama et al., 2007).

Urban Interventions

We review a series of existing examples of urban interventions across the world that act as memory collectors, community consultation devices, communication facilitators or performance generators. The purpose of this review is to identify the qualities and opportunities of these examples highlighting how they have informed the design development of the *InstaBooth*. Table 1 collects a range of “booth-like” urban interventions that have been deployed in different parts of the world with the common purpose of collecting the memories and stories of local people.

Table 1. Urban Interventions Across the Globe

		TENSE			TYPE			
		Past	Present	Future	Memory Collector	Community Consultation	Communication Facilitator	Performance Generator
UWB Storytelling Booth	<input checked="" type="checkbox"/> BOOTH <input type="checkbox"/> OTHER Collect, archive and work with unique stories of students & find a cumulative narrative that unfolds through its spaces. Date: Ongoing Location: Bothel, USA Setting: University of Washington							
DIY Shrine	<input checked="" type="checkbox"/> BOOTH <input type="checkbox"/> OTHER Capture insight of festival participants and have them engage with festival theme of 'shrines'. Date: 2014 Location: Melbourne, Australia Setting: Fed Square's Winter Festival							
Through the eyes of Goldcoasters	<input type="checkbox"/> BOOTH <input checked="" type="checkbox"/> OTHER ABC Goldcast radio team asked people to reflect on the 'PAST', describe the 'PRESENT' and imagine the 'FUTURE' of the Gold Coast on chalkboards. Date: 2014 Location: Gold Coast, Australia Setting: Morning, Beachside							
JetBlue Storybooth	<input checked="" type="checkbox"/> BOOTH <input type="checkbox"/> OTHER Web and television campaign inviting people to tell their personal JetBlue story and become part of the "brand co-creation" process. Date: 2006 Location: USA Setting: 10 City Tour							
StoryCorps	<input checked="" type="checkbox"/> BOOTH <input type="checkbox"/> OTHER Designed to inspire people to keep stories alive by make digital recordings of stories accessible to the public. Date: 2003 Location: USA Setting: Various Public Sites							
City and You	<input type="checkbox"/> BOOTH <input checked="" type="checkbox"/> OTHER The temporal public art project is focused on creating an 'audio landscape' using various analog and digital media. The collected stories will result in a 'cityscape' in the form of a story using text and video, which can be shared with the world using... Date: 2013 Location: Ahmedabad, India Setting: Throughout City							
Voice It	<input type="checkbox"/> BOOTH <input checked="" type="checkbox"/> OTHER An outlet for people to discuss their city's built future using an interactive opinion system that takes debate to the streets, online and back to museum again. Date: 2011 Location: Vancouver, Canada Setting: The Museum of Vancouver							
City Feedback	<input type="checkbox"/> BOOTH <input checked="" type="checkbox"/> OTHER Stimulate sensorial interaction & genuine responses by inviting people to describe their experience of New York on Yellow Cards found in telephone booths. Date: 2008 Location: New York, USA Setting: 30 Public Telephone Booths							

Memory Collectors

The different interventions that fall under the memory collector category indicated in Table 2 use different media in a range of ways and similarly they are trying to reach parts of society who may not be the most vocal in having their say or sharing their memories.

Table 2. Urban Interventions in the Memory Collector Category

	TENSE			TYPE				METHODOLOGY										
	Past	Present	Future	Memory Collector	Community Consultation	Communication Facilitator	Performance Generator	Performance/Movement	Geo-based technology	Photo	Video	Audio	Social Media	Analogue	'Confession'/ Storytelling	INTERVIEW	Theme / topic related discussion	Collaborative Storytelling
UWB Storytelling Booth ■ BOOTH □ OTHER Collect, archive and work with unique stories of students & find a cumulative narrative that unfolds through its spaces. Date: Ongoing Location: Bothel, USA Setting: University of Washington																		
DIY Shrine ■ BOOTH □ OTHER Capture insight of festival participants and have them engage with festival theme of 'shrines'. Date: 2014 Location: Melbourne, Australia Setting: Fed Square's Winter Festival																		
Through the eyes of Goldcoasters □ BOOTH ■ OTHER ABC Goldcast radio team asked people to reflect on the 'PAST', describe the 'PRESENT' and imagine the 'FUTURE' of the Gold Coast on chalkboards. Date: 2014 Location: Gold Coast, Australia Setting: Morning, Beachside																		
JetBlue Storybooth ■ BOOTH □ OTHER Web and television campaign inviting people to tell their personal JetBlue story and become part of the "brand co-creation" process. Date: 2006 Location: USA Setting: 10 City Tour																		
StoryCorps ■ BOOTH □ OTHER Designed to inspire people to keep stories alive by make digital recordings of stories accessible to the public. Date: 2003 Location: USA Setting: Various Public Sites																		
City and You □ BOOTH ■ OTHER The temporal public art project is focused on creating an 'audio landscape' using various analog and digital media. The collected stories will result in a 'cityscape' in the form of a story using text and video, which can be shared with the world using social media. Date: 2013 Location: Ahmedabad, India Setting: Throughout City																		

To reveal the nature of these interventions in more detail two of the urban interventions from Table 2 are discussed further.

Melbourne, Australia - The *DIY Shrine* was built by the Melbourne based production company, Umbershoot, and was placed at Federation Square, Melbourne during their 2014 annual winter festival. The *DIY Shrine* was designed to assist in capturing the insight of festival participants, for them to share their experience and engage with the festival theme of 'shrines' over a 22-day period. The *DIY Shrine* incorporates an iPad with a custom built application and a built in GoPro. The iPad displays questions to prompt users to share their confessions, which were video recorded and uploaded to the Federation Square Vimeo channel and displayed on the large urban screen located within Federation Square.

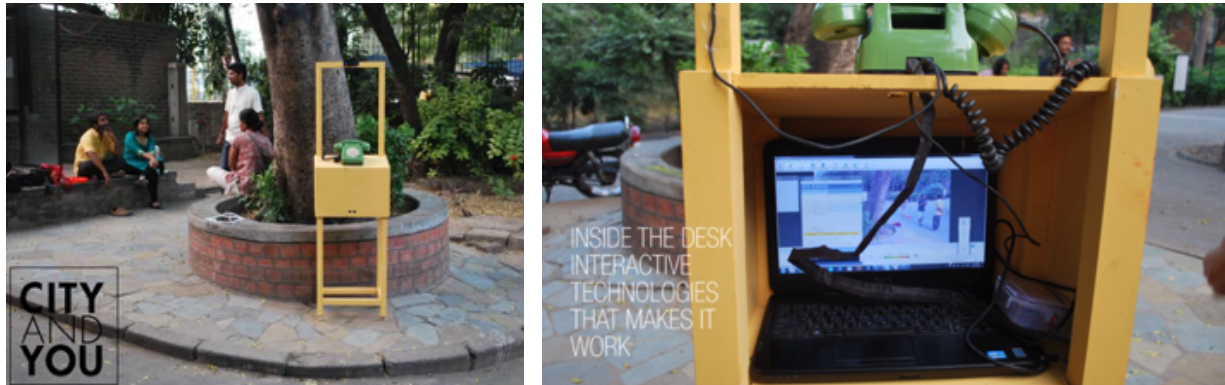


Figures 37 a & b. *DIY Shrine* Images www.bandt.com.au/media/gopro-confessional-booth-provides-real-insight-festival-visitors & <https://vimeo.com/channels/diyshrine/98903369>

The information gathered from the participants in the *DIY Shrine* was rich in content, providing authentic responses that surpass typical marketing surveys as Rebecca Riley indicates, “Heartfelt answers were offered without any trepidation. From shrines to family and lost loved ones to homages to guide dogs, Nelson Mandela, football teams and even pet guinea pigs, visitors young and old openly shared what they held dearest in their lives,” (2014). This quote reveals the range of comments that people left behind indicating that people felt comfortable sharing meaningful and personal stories with the *DIY Shrine*. The size of the *DIY Shrine* is important to consider, from its pictures we can see that two adults can fit inside it comfortably but probably no more than that. Two people can have a conversation inside the *DIY Shrine* and feel private, even though the stories are recorded and shared with the general public through the vimeo channel and the urban screen. This sense of intimacy probably assisted in provoking people to share the rich content, overall it provides a different experience than answering an online survey or being interviewed by a stranger.

Ahmedabad, India – *City and You: Tell your story and reconstruct the city*, is a temporal public art project which travels across the city of Ahmedabad, India collecting stories and memories of people and the city using a rotary telephone on a desk. Inside the desk, there are interactive technologies that make it work. When participants pick up the phone, a voice will ask them questions such as; “what does Ahmedabad mean to you?”; “what do you find very special about this place?”; “How do you relate to your city?”. The project is focused on

creating an ‘audio landscape’ using various analogue and digital media. The collected stories results in a ‘cityscape’ in the form of a story using text and video, which can be shared with the world using social media.



Figures 38 a & b. City and You from <https://vimeo.com/88567721> & <http://devyanijain.com/2013/12/30/cityandyou/>

Community Consultation Devices

This section presents a number of examples where researchers have developed experimental methodologies that seek to re-interpret the consultation process and the role of the client to provide a better outlet for their voices to be heard and considered.

Table 3. Urban Interventions in the Community Consultation Category

	TENSE			TYPE			METHODOLOGY											
	Past	Present	Future	Memory Collector	Community Consultation	Communication Facilitator	Performance Generator	Performance/Movement	Geo-based technology	Photo	Video	Audio	Social Media	Analogue	Confession / Storytelling	Interview	Theme / Topic related discussion	Collaborative Storytelling
Voice It An outlet for people to discuss their city's built future using an interactive opinion system that takes debate to the streets, online and back to museum again. □ BOOTH ■ OTHER Date: 2011 Location: Vancouver, Canada Setting: The Museum of Vancouver																		
City Feedback Stimulate sensorial interaction & genuine responses by inviting people to describe their experience of New York on Yellow Cards found in telephone booths. □ BOOTH ■ OTHER Date: 2008 Location: New York, USA Setting: 30 Public Telephone Booths																		
cityTALKING Orchestrate the public to reveal & activate the experience of city by collecting narratives of the public via an anonymous conversation that is broadcast back into public spaces of city. ■ BOOTH □ OTHER Date: 2006 Location: Melbourne, Australia Melbourne Laneways Setting:																		

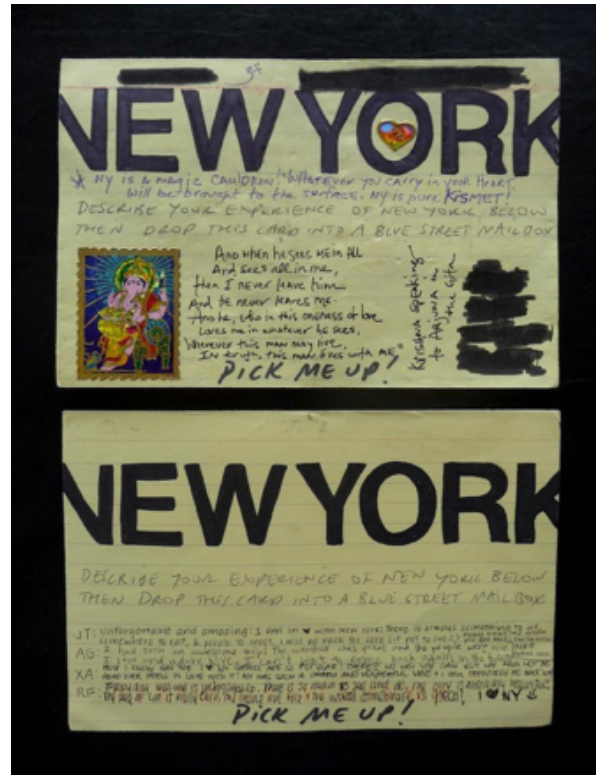
Table 3 compares three urban interventions that fall under the community consultation category that shows the different tenses (Past, Present, or Future) in which the interventions are trying to capture through the feedback provided by participants. Table 3 demonstrates the methods used to conduct the consultation showing that each project uses a combination of at least two different methods.

Melbourne, Australia - *City Feedback* and *CITYtalking* are both part of an evolving series of interactive mobile booth constructions developed by Action Research/Performer Astra Howard for her PhD ‘Orchestrating the public: to reveal and activate through design the experience of the city’. The series was developed to “stimulate sensorial interaction between the researcher and the public (The Trojan Horse Effect), disabling normal means of communication in order to encourage and facilitate more genuine and intimate responses,” (Howard, 2005).



Figures 39 a,b, & c. *CITYtalking* from <http://www.astrahoward.com/project-history/2006/citytalking/s>

The *CITYtalking* project was commissioned by Melbourne City Council Laneways Commission and was wheeled around Melbourne streets for 5 weeks during 2006, stopping at selected laneways around the city. The project collected narratives of ordinary members of the public who agreed upon entering the booth to engage in an anonymous (blind) conversation that would be broadcast back into the public spaces of the city. Using an intercom between two compartments within the booth, Astra Howard would listen to their story which was then transcribed, edited and published to two LED screens on the outside of the vehicle for pass-by to read. By quickly publishing the stories onto the outside of the booth not only did it reveal the stories to the public but also the LED screens would call the attention of people in the vicinity and attract or distract them from the booth. The fact that the experience for participants was anonymous is an important factor to consider as this probably helped attract people to tell their story.



Figures 40 a & b. *City Feedback* from <http://www.astrahoward.com/project-history/2008/city-feedback>

Astra Howard’s other project *City Feedback* occurred in New York in 2008 and involved stencilling the words ‘New York’ on 30 yellow cards which were placed in thirty public telephone booths throughout the city with a black pen. Each card was a personal invitation for passers-by to describe their experience of New York before dropping it into a blue street mailbox. A stamp and sticker with a return address on the back of each card allowed for each card to be returned to Action Research/Performer Astra Howard.

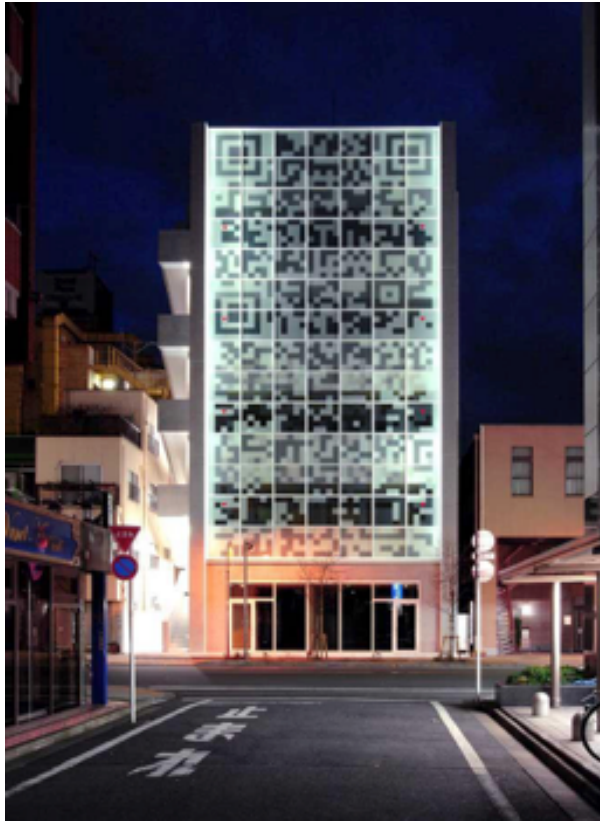
Communication Facilitator and Performance Generators

This section collects different examples where creators have attempted to provide opportunities for information to be more readily communicated by the public through the urban interventions and in some instances promote the performance of participants as they engage with the intervention. Table 4 indicates that the interventions collected all focus on the present tense, therefore they obtain the thoughts of people have of today, their current state of time and not to project their desire or views for the future. The interventions use different methods and technologies to promote participation from users.

Table 4. Communication Facilitators and Performance Generator of Urban Interventions

	TENSE			TYPE			METHODOLOGY											
	Past	Present	Future	Memory Collector	Community Consultation	Communication Facilitator	Performance Generator	Performance/Movement	Geo-based technology	Photo	Video	Audio	Social Media	Analogue	Confession/ Storytelling	Interview	Theme / Topic related discussion	Collaborative Storytelling
<p>The Love Booth - Hotel Yeoville □ BOOTH ■ OTHER</p> <p>An interactive art project aimed at creating a 'social map' & explore concept of belonging & home. Participants contribute to continuing narrative of Hotel Yeoville by attaching notes to photos taken in booth for all to see.</p> <p>Date: 2010 Location: Johannesburg, South Africa Setting: Public Library Exhibition</p>																		
<p>N Building □ BOOTH ■ OTHER</p> <p>In favour of billboards, the entire façade of commercial building is a QR which links people to a website with shopping information and features augmented reality i.e. display of tweets of users inside building.</p> <p>Date: 2009 Location: Tokyo, Japan Setting: Shopping District</p>																		
<p>Night Lights □ BOOTH ■ OTHER</p> <p>Turn building into "Interactive Playground" through 3 interactive modes, allowing viewers to become performers by amplifying their body movements and projecting them onto building.</p> <p>Date: 2009 Location: Auckland, New Zealand Setting: Auckland Ferry Building</p>																		

Tokyo, Japan - N Building, is an urban intervention that facilitates the communication of advertisements by making the entire facade of a commercial building a QR code in favour of using billboards. The building designed by Terada Design ARCHITECTS, felt that the kind of billboards which typically adorn commercial city buildings, would undermine the structure’s identity “In this manner we envision a cityscape unhindered by ubiquitous signage and also an improvement to the quality and accuracy of the information itself” (Terada Design in Welch, 2010). The building is located amidst a shopping district in Tachikawa station in Tokyo, allowing people to read the QR Code with a mobile device. There are two levels of interaction; the 1st generation links the QR code to a website which includes up to date shopping information; the 2nd generation provides augmented reality features such as the display of tweets by users inside the building as they are posted.



Figures 41 a & b. N Building Images from <http://www.e-architect.co.uk/tokyo/n-building-tokyo>

In the *N Building* example the façade of the building facilitates the communication between people inside the building and people outside on the street by accessing the website that collects the tweets from users.

Reflections On Taxonomy

Tables 1-4 give an overview of twelve examples of Urban Interventions that have been created around the world in the following countries; United States of America, Australia, Canada, New Zealand, Japan, India, and South Africa.

Table 5. Typology of Urban Interventions

TYPE	# PROJECTS
Memory Collectors	6
Community Consultation	3
Communication Facilitators	2
Performance Generator	1

When examining the typologies of the interventions as indicated in table 5, we find that six of them are considered memory collectors, three act as community consultation devices, two are communication facilitators and one a performance generator.

Table 6. Methodology of Urban Interventions

METHOD USED	# PROJECTS
Geo-based technology	1
Performance / Movement	2
Audio (No Video)	2
Social Media / SMS	2
Collaborative Storytelling	2
Video	3
Analogue	4
Theme / topic related discussion	5
Interview	5
Confession / Storytelling	7

Table 6 reveals the different methods the interventions used to engage with the people in each location where we can see that a large number of projects used the interview method to directly ask people specific questions and encourage a dialogue to occur. This suggests that the interview is an important method for guiding data collection and keeping the stories people told on track and inline with the theme or area of interest. A limited number of exemplar projects utilised Geo-based technology, performance and social media. The projects that utilised these methods in their interventions made them the primary focus of the project. Just over half of the interventions encouraged participants to share their confessions and engage in storytelling activities.

Table 7. Story Type of Urban Interventions

Urban Intervention	Story Type
<i>JetBlue</i> (Memory Collector)	Personal Stories
<i>StoryCorps</i> (Memory Collector)	Personal Stories
<i>The Love Booth</i> (Communication Facilitator)	Personal Stories
<i>cityTALKING</i> (Community Consultation)	Personal Stories
<i>City Feedback</i> (Community Consultation)	Opinion-based
<i>DIY Shrine</i> (Memory Collector)	Opinion-based
<i>City and You</i> (Memory Collector)	Opinion-based

The types of story collected through the interventions are compared in Table 7 revealing that many were personal stories with others being opinion based stories relating to specific questions prompted through the intervention. A large proportion of the sampled interventions focused their project around a particular theme or topic. The *DIY Shrine* was the only one that focused on a theme related specifically to the immediate setting, which in this case was a festival about shrines. The others focused on the topic of place, related the location or city in which the project was carried out. Whilst *Voice It* used it as an opportunity to discuss the city’s built “future”, both *City Feedback*, *City and You* and *The Love Booth* all focused on allowing people to describe their current experience of their cities and what their current place means to them. *Through the Eyes of Gold Coasters* was the only project to focus on stimulating discussion on the topic of place simultaneously in past, present and future.

Only two exemplar projects explored collaborative storytelling. Where *City and You* explored a more digital based method for stitching together recordings to resulting in a ‘cityscape’ or ‘audio landscape’, the *Love Booth* chose a more low-tech option of creating a continuous narrative or ‘social map’ whereby stories can be left behind on a library wall for all to see. The *UWB*, *Love Booth*, *City Feedback* and *Through the Eyes of Gold Coasters* all strictly utilised analogue methods, with the *UWB* as the only example of the four to incorporate a combination of digital and analogue methods. Location was not necessarily a determining

factor for choosing low-tech options as strictly analogue methods were used in South Africa, North America and Australia.

Table 8. Location of Urban Interventions

COUNTRY	TYPE	METHOD
USA	Memory Collector Community Consultation	Video, Audio, Analogue, Interview, storytelling Multi-Method
AUSTRALIA	Memory Collector Community Consultation	Video, Storytelling, topic related, analogue, interview
INDIA	Memory Collector	Audio, storytelling, interview, collaborative storytelling
CANADA	Community Consultation	Performance, movement
SOUTH AFRICA	Communication Facilitator	Performance/movement, analogue, photo, theme/topic, storytelling
JAPAN	Communication Facilitator	Geo-based tech, social media.
NEW ZEALAND	Performance Generator	Performance/movement.

Referring to table 8, whilst aspects of the location may have had a bearing on the type of project or methods used, it cannot be understood from the information at hand. There wasn't any clear indication that the country that the project occurred in had any real impact on the type or methods used. There was little difference between most of the countries, with many projects using a combination of methodologies.

Guidelines for the InstaBooth

Drawing from the literature review and case studies acknowledged in the previous sections of this paper we have established a set of design guidelines to inform the design and experience of the *InstaBooth*. Using the steps outlined by Agostini et al. (2002) to assist the creation of social memory we can discuss how the *InstaBooth* facilitates memory collection to propose the imagination of possible futures for our cities.

1. Facilitate Content Collection:

By situating the *InstaBooth* in public urban spaces the interactions designed to engage and promote participation from the community are accessible to people in the context in question. Participants don't have to rely on using a computer at home or having access to Internet, the technology is taken to the urban space to facilitate content collection. Combining interactions that use analogue and digital technologies will create a hybrid approach to engaging with

people with different interests, knowledge and capabilities. It is our intention to obtain information from as broad a spectrum of people as possible.

2. *Enhance Information Representation*

Digital comments collected through Twitter and SMS are represented and displayed via Discussions in Space (DIS) (Schroeter, 2012) and displayed through an urban screen housed within the *InstaBooth*. DIS was created to promote discussions regarding a specific question for community consultation purposes. Responses are dynamically revealed to the public through the screen with the intention of creating a discussion about the specific topic in question. The *Overhead and Overdrawn* display system is a bespoke interaction setup using a projector to display messages or drawings that participants have created to the outside of the *InstaBooth*. The projector can be angled to project onto the pavement or a building near the *InstaBooth*. The projector enhances the experience of the content that is created by displaying on other parts of the city in a non-permanent but visual and captivating way. Through these interactions the information generated by *InstaBooth* users will be enhanced.

3. *Support Knowledge Dissemination*

The interactions involved in the *InstaBooth* have the ability to display the comments other people have written or pictures they have drawn. By revealing this information the *InstaBooth* becomes a sort of public notice board that provides commentary on a theme, which is relevant to the location where it is placed and/or the event it coincides with. The *InstaBooth* has been designed and created from a multi-disciplinary group of academics from the Queensland University of Technology as part of a research funded grant. Therefore the outcomes of the *InstaBooth* will be documented, analysed and written for publication through international conferences, journals and books where the knowledge created through the *InstaBooth* will be disseminated.

4. *Allowing Content Enrichment*

Participants will be the creators of the content by sharing their thoughts through the different interaction mechanisms provided in the *InstaBooth*. The process of encouraging and soliciting responses, feedback, and ideas through the *InstaBooth* allow for rich content to be

created by the co-located users of it. We anticipate that these participatory methods will supplement data collected regarding the *InstaBooth's* users experience from traditional surveys and interviews.

Defining the InstaBooth

Media Architecture has been defined by (Brynskov et al., 2013) as “*an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities,*” (p. 1-2). According to this definition and our previous research identifying strategies to create DIY Media Architecture (Caldwell & Foth, 2014), we define the *InstaBooth* as a form of DIY Media Architecture. The *InstaBooth* is a form of media architecture in itself as it has been specifically designed to house a range of digital and interactive media. The DIY component comes from the *InstaBooth's* ability to co-create content with the users. It is the people who can respond to questions, they can ask others questions, they can record and share their thoughts and images. Through the *InstaBooth* we propose a novel approach to integrating media in the city through both the physical intervention and the discussions from citizens that the *InstaBooth* solicits. This mechanism of intervening with public space seeks to step beyond one-click responses providing an intimate yet public forum to facilitate the debate and content creation from situated users.

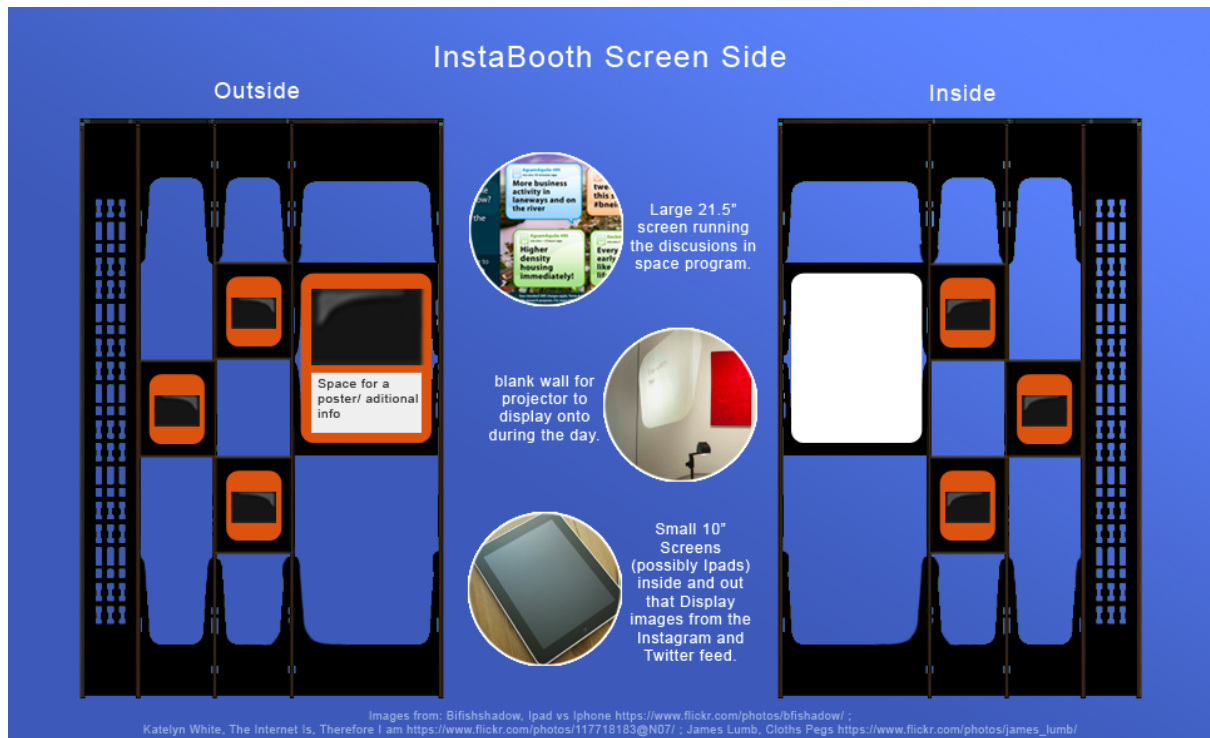


Figure 42. Diagram of Interactive Technology in the InstaBooth by Ben Carden

The purpose of the *InstaBooth* is to explore a combination of engagement and co-creation approaches in different locations. A rigorous research study will examine not only the engagement of participants and the value of their contributions to the discussion around the history of our city and the future design of it but also to explore the impact of such an urban intervention. The findings of this research will promote the value of urban interventions in providing a voice for more people in the discussion regarding urban planning, architectural design, community consultation and engagement strategies.

5.2 The InstaBooth: Making Common Ground for Media Architectural Design

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 5.2:

Caldwell, Glenda Amayo , Guaralda, Mirko , Donovan, Jared , & Rittenbruch, Markus (2016) The InstaBooth: Making common ground for media architectural design. In *Media Architecture Biennale 2016* , 1-4 June 2016, The Concourse, Sydney, N.S.W.

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDALD CALDWELL	Significant contribution to the planning of the paper, literature review, conducting the study, and assisted with the preparation and evaluation of the manuscript.
SIGNATURE	
DATE	15 July 2016
MIRKO GUARALDA	Contribution to the planning of the paper and assisted with conducting the study, the preparation and evaluation of the manuscript.
JARED DONOVAN	Contribution to the planning of the paper and assisted with conducting the study, the preparation and evaluation of the manuscript.
MARKUS RITTENBRUCH	Contribution to the planning of the paper and assisted with conducting the study, the preparation and evaluation of the manuscript.

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

This paper discusses the design process of the InstaBooth. I wrote the majority of the paper with contributions from the co-authors who assisted in providing insight from architectural and interaction design perspectives. Revisions and editing was done by all authors of the paper. The paper was presented at the Media Architecture Biennale 2016 in Sydney.

Preamble

The design of the InstaBooth involved input from academics and practitioners across different disciplines including architecture, urban informatics, interior design, interaction design, urban planning and business. The aim of the paper was to reveal the design process through which the different disciplines and participants came together. The paper discusses the use of design workshops and physical prototypes to assist communication across disciplinary perspectives while highlighting some of the challenges and benefits of working in collaborative teams, it addresses research question #1: *How can a DIY/DIWO media architecture be designed?*

Caldwell, Glenda Amayo , Guaralda, Mirko , Donovan, Jared , & Rittenbruch, Markus (2016) The InstaBooth: Making common ground for media architectural design. In *Media Architecture Biennale 2016* , 1-4 June 2016, The Concourse, Sydney, N.S.W.

Abstract

Media Architecture has emerged from and relies upon a range of different disciplinary traditions and areas of expertise. As this field develops, it is timely to reflect upon the ways in which designers of different disciplinary stripes can be brought together to collaborate in a design process. What are the means by which design teams can establish a ‘common ground’ where design work can take place while recognising the diversity of ways of working those different disciplines bring to the process?

A co-design approach has been the fundamental backbone of the InstaBooth project, which has brought together a multi-disciplinary design team of academics and practitioners. The intention of this project has been to explore the combination of digital and physical interactions within a small media architecture installation to intervene with urban environments and public places for the purposes of community engagement. It is by exploring the design process of the InstaBooth project that we highlight the value of multi-disciplinary collaborations, the lessons that can be learned, and the struggles and hurdles along the way. This paper highlights the iterative process of design, the materials and physical prototypes that were employed to ultimately create a working version of the InstaBooth, a media architecture that evolves as users push its boundaries and take ownership of the installation. The concept of the InstaBooth continues to develop not only as more data are collected on its mechanics and potentials through observations, interviews and workshops, but also as more and more users engage with the installation in their individual ways.

CCS Concepts

Human-centered computing~Interaction design theory, concepts and paradigms;
Applied computing~Architecture (buildings); Applied computing~Media arts

Keywords

Media Architecture; Architectural Design; Interaction Design; Co-Design;
Participatory Design; Prototyping

Introduction

Media architecture is an emerging field of design that inherently brings together a range of disciplines such as architecture, interaction and visual design, HCI, urban informatics, lighting designers, media artists, and much more. Brynskov et al. (2013) define media architecture as, “an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities,” (p. 1-2). In previous research we extended this definition to the concept of DIY media architecture (Caldwell & Foth, 2014), which enables the contributions of the situated users to the content creation of the media for their own purposes. The contribution of this paper specifically focuses on advancing the knowledge around the design process of media architecture by exploring design methods and approaches of The InstaBooth (Johnstone et al., 2015) (Figure. 43), a small-scale, DIY/DIWO media architecture prototype (Caldwell & Foth, 2014) aimed at providing a voice to city inhabitants through a series of digital and physical playful interactive components.



Figure 43. The InstaBooth Photo Credit: Xavier Ho

The InstaBooth prototype consists of a portable and collapsible structure loosely inspired by a phone booth. Its modular design allows different interactive components to be deployed based on the type of envisioned community engagement. The InstaBooth was initially conceived to deal mainly with the dynamics of public consultations, but in developing this concept architectural design methods and theories were combined with interactive media and urban informatics.

The InstaBooth combines a range of bespoke interaction modules to facilitate the creation of dialogue and the sharing of ideas (Johnstone et al., 2015). It allows a peer-to-peer interaction between the different users, who are able to see and comment on other citizens' answers in order to foster a debate about different social issues. By blending digital and analogue modalities a larger cross section of the population can participate in the discussion regardless of their technical knowledge, access to technology, or ability to read or write. Through the InstaBooth users can contribute by drawing a picture, writing a note, tweeting a message, voting on a picture, or even giving a hug. Digital and physical interactions are blended together to allow different users with different attitudes to provide feedback. Ultimately, the

intention of the InstaBooth is to provide an engaging platform that can easily be adapted to collect citizen feedback on a range of different topics in different contextual settings.

Over the course of 2015 the InstaBooth was deployed in seven different locations around Southeast Queensland, principally in the city of Brisbane, Australia. Through each deployment the InstaBooth was closely aligned with an event or community partner. From these events we have evidence based on interviews, observations, workshops, photos and videos that indicate the InstaBooth has been an effective tool for community engagement and placemaking. The purpose of this paper however is to describe in detail the design process of the InstaBooth and to highlight how the various stages of this process, including the conceptual design, various stages of prototyping, and its fabrication have helped to shape the success of our prototype. Co-design and critical making (Ratto, 2011) principles have informed and guided the process through which we approached the project. The contribution of stakeholders from different disciplines and backgrounds has been critical throughout the evolution of the InstaBooth and continue to inform its ongoing development. Not only will this paper highlight the positive outcomes and benefits, it will also discuss the challenges and hurdles of such an undertaking.

The following sections of this paper examine the principles of critical making and co-design as mechanisms to promote collaboration across disciplines, followed by a detailed account of the design and fabrication stages of the InstaBooth. Like most design projects the process has been iterative and not linear. We continue to learn through the users of the InstaBooth and the design is still ongoing, evolving to suit the different needs of each community, aiming to increase its impact and success.

Critical Making and Co-Design

Fischer et al. (2005) point out that both scientific and artistic innovation arises from “joint thinking, passionate conversation and shared struggles” (p.483), which also describes the design process and implementation that we undertook to create the InstaBooth. *Meta-design* is a system (techniques, processes, objectives) that allows users to be creative by shifting the focus from the design of a finished product to the lessons that can be learned by making mistakes (Fischer & Giaccardi, 2006). This process allows an open system for the generation of new insights, new knowledge and new understanding (Fischer et al., 2005). A meta-design

strategy is employed in the formation of the design process of the InstaBooth where its design and implementation is intended to act as a “Creative Catalyst” (Ogawa et al., 2012, p.58), to promote a collective creativity experience through the processes of drawing, writing, and making. This strategy is continued through the interactive components housed within the InstaBooth, which itself takes on the role of being a creative catalyst, inspiring its users to share and think creatively.

Critical making is a method developed by academics at the University of Toronto used to acquire insights into the attitudes, perceptions and connections people have with technology such as 3D printing (Ratto, 2011; Ratto et al., 2011; Ratto & Hockema, 2009; Ratto & Ree, 2012). The aim for critical making, similar to HCI research, “is to connect technological systems and practices to critical scholarship and ideas. However, where our method finds distinction is that we also engage collective hands-on experimentation (making), the results of which serve as ‘cultural probes’ (Gaver et al., 1999) that help open conceptual channels of discourse to augment traditional ethnographic practices,” (Ratto & Ree, 2012). Critical making methods include collaborative workshops, sessions or meetings that encourage participants to physically engage in, experiment with and discuss the making process and technology used (Ratto & Ree, 2012).

Emerging from the context of designing work environments and computer systems, participatory design is rooted in Scandinavian design traditions (Bodker & Pekkola, 2010; Muller, 2003; Muller & Kuhn, 1993) and has led to the more recent trend of harnessing collective creativity through co-creation, co-design (Sanders & Stappers, 2008). According to Steen, it is the intention of participatory design to allow for potential users a role in the design, evaluation and implementation (Steen, 2011) of artefacts or processes. Acknowledging that the notion that participation is in itself a barrier to participatory design as “Participation is difficult human behaviour to accommodate since every person and every situation is unique,” (Jakovich et al., 2006, p. 249), our intentions for the InstaBooth project (Johnstone et al., 2015) are in line with Greenbaum and Halskov who believe participatory design to be a way to better “facilitate communication and cooperation between people with diverse backgrounds” (1993, p. 47). Based on participatory design principles we recognise that the process we undertook to design the InstaBooth was more inline with current

definitions of co-design, where the researchers/designers supported potential users in developing conceptual ideas and knowledge (Steen, 2011). Therefore, combining critical making and co-design methods has been the backbone of the creation and implementation of the InstaBooth.

The Design Stages

The InstaBooth was funded through a competitive internal university grant scheme, which aims to engage industry and community partners in research projects. The InstaBooth project was conceived at the Queensland University of Technology (QUT) Creative Industries School of Design. The research team comprised a cross-disciplinary group of academics from the disciplines of architecture, interior design, interaction and visual design, human-computer interaction, interior design, urban planning and business. It further included academics from the California Polytechnic University (CalPoly) at San Luis Obispo in the U.S., industry partners from local architecture and engineering practices, and professional groups, which provided a wealth of knowledge and richness to the project. Drawing upon the different contextual experiences, design traditions and practices of a mix of interdisciplinary contributors was at times challenging. However, understanding the different contributions that each person was bringing into the equation, allowed us to respond more comprehensively to a range of issues and potential backgrounds. The richness of the project is a result of the contributions of the academics, professionals, and participants involved in the many stages of fruition and the critical discussions that resulted from their participation in a series of design workshops. The following sections will discuss the generation and harnessing of ideas to establish common goals and a sequence of events.

Brainstorming to Bodystorming

Involving input from many different academics, professionals, and participants was promoted through a combination of the co- design approach and critical making. Hosting three different design workshops over the course of six months from July – December 2014 allowed the team to collaborate on design objectives, explore design outcomes, and envision future possibilities.

First design workshop

The first co-design workshop was conducted over a period of three days and actively involved the input of undergraduate students from the QUT School of Design. The InstaBooth concept was presented to the workshop participants and discussed focusing on the concept of creating a telephone booth inspired multi-media structure to promote community engagement around urban design. Figure 44 is the image of the initial design concept that was used to articulate our vision for the InstaBooth.



Figure 44. The conceptual sketch of the InstaBooth. Photo Credit: Glenda Caldwell

The participants were broken up into small groups of 4-5 participants, each composed of an undergraduate student, academics and professionals from a mix of different disciplines. Each group spent the afternoon brainstorming and sketching ideas for the design of the InstaBooth, Figure. 45. At the end of the session the groups presented their ideas and discussions proceeded. Based on the feedback the undergraduate students had the following day to continue to develop their concepts further on their own. On day three all the participants were invited back to go over the design evolutions presented by the undergraduate students. At the end of the presentations and through discussion a series of issues became evident regarding the design proposition of the InstaBooth pertaining to; scale, flexibility, materiality, weather protection, technology, and construction.



Figure 45. Co-design workshop. Photo Credit: Glenda Caldwell

CalPoly Designs

The initial sketches highlighting these issues required the core team to reconsider the objectives and redefine the design brief. The revised brief was subsequently shared with our colleagues at CalPoly who worked within a third year architectural design studio to explore the design further. The CalPoly architecture students established design teams with students from arts and engineering to further conceptualise an interdisciplinary proposal of the InstaBooth. The CalPoly students presented six different designs to the QUT team via Skype. The different proposals were equally compelling and feasible however based on the budget, and feasibility of construction, we selected one of the proposals as a basis for further design evolution. The core QUT design team worked together to push the design further.

Second design workshop

A second co-design workshop was organised with the intention to confirm the structural design of the InstaBooth and begin to explore its interactive components. Participants consisted of members of the research team and were recruited amongst RHD students of the Urban Informatics Research lab, a cross disciplinary group situated between human-computer interaction, architecture and urban planning. Using a range of materials including large sheets of corrugated cardboard, paper, boxes, tubes, string, cables, plastics, glues, ropes and more, the focus of the workshop was to create as many prototypes as possible. Participants formed

groups and began to explore different aspects of the InstaBooth. One of the groups focused on the design of the InstaBooth and created a 1:1 scaled cardboard model of the InstaBooth as seen in Figure 46. This was a critical step towards finalising a construction method and general aesthetic of the InstaBooth as it allowed the participants to explore the size, the footprint, interior dimensions, and height of it. We agreed that it had to allow for at least two people to fit inside the booth, and be wide enough to accommodate a wheelchair to be fully accessible.

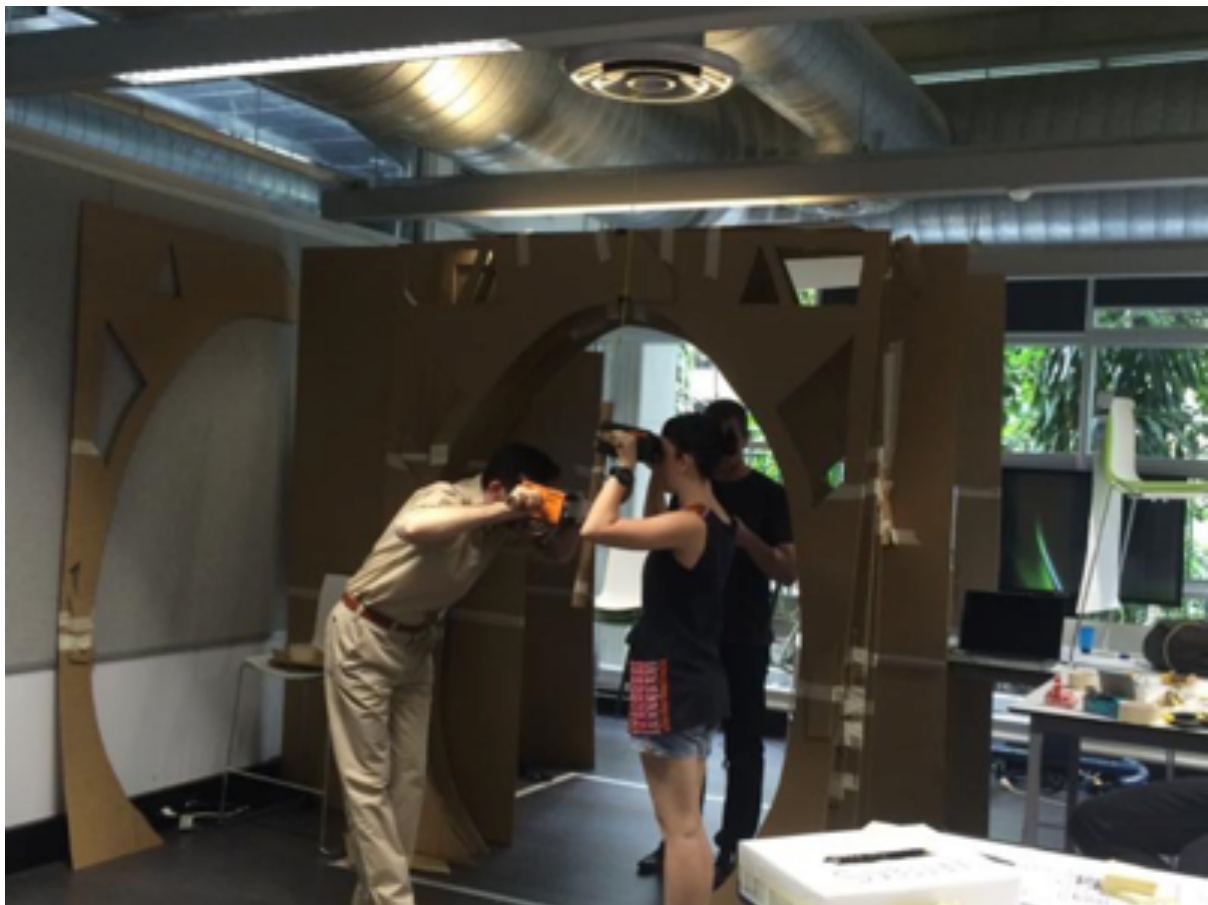


Figure 46. Cardboard scaled prototype of The InstaBooth. Photo Credits: Glenda Caldwell

The interaction designers within the group contributed to the workshop by promoting experience prototyping (Buchenau & Suri, 2000) and bodystorming methods. By using our bodies to physically feel the sense of space provided by the structure we were able to achieve a much better understanding of the minimum dimensions for the InstaBooth. Specific technologies, such as the oculus rift, touch screens and smart-phones, were referred to as possible candidate technologies around which participants could imagine and explore the

technological aspects of the interactions to be incorporated into the booth. Using the large model participants acted out the interactions they had created and designed for the InstaBooth. The process of performing the interactions and engaging with the physical structure of the InstaBooth effectively communicated the ideas that were generated and provided a deeper understanding of how the InstaBooth would be used in a public space, Figure 47. The workshop provided the physical manifestation of ideas, which was a progressive step forward in the design process of both the structure of the InstaBooth and the interaction content within it and how these could be integrated in the final booth.



Figure 47. Cardboard prototype photoshopped into an urban space. Photo Credits: Glenda Caldwell

Third design workshop

A third and final co-design workshop was held a month later which followed a similar process as the previous one however focused specifically on the more detailed design of further interactions. A range of physical materials were used by groups of participants to

create interactions that specifically focused on the original intent of the InstaBooth project which was to record the past and design the future for urban environments, Figure 48&49.



Figure 48. Prototyping interaction modules. Photo Credits: Glenda Caldwell



Figure 49. Exploring interaction mechanisms. Photo Credits: Markus Rittenbruch

In this instance the large cardboard model of the InstaBooth structure was cut into, taped, pinned, drawn on and altered when needed to explore the ways in which the interactions would be fixed, attached, or embedded in the structure. This was a significant opportunity to explore how the booth was truly merging media and architecture with the intention to be experienced and perceived as a media architecture entity.

Body storming and simulated interaction approaches were used to explore the suitability of different interaction approaches for different engagement contexts. The design concepts that emerged from the third workshop were informed by the outcomes from the previous design workshop, which continued to explore a range of digital and physical media. The physical media, largely paper based, tended to provide tangible interactions. Alternatively, the digital media relied on screens and projectors to display applications that could visualise different communication channels such as Twitter feeds or photos from Instagram.

This prototyping process of the interactions highlighted contributing factors crucial to the design of the InstaBooth, including that the structure had to allow for flexibility, addition or removal of interactions, connection to technology and electricity, and weather protection. It was from this point onwards that we realised the ideas for the interactions were plentiful and that each one had its own set of characteristics and materiality therefore we refer to them as interaction modules, which can be interchanged or rearranged to suit the context for each deployment.

The value of prototypes

Sketches and drawings can often be abstract and difficult to convey spatial or performative aspects of an idea therefore the combination of the co-design and critical making process, with experiential prototyping provided not only a fun and entertaining way to explore ideas but fostered creative outcomes. From the design workshops twenty-one different digital and physical interaction modules were proposed and have been compiled into a catalogue of ideas. Out of the initial set of design concepts seven were fully developed and placed in the current InstaBooth. To supplement the paper based and tangible interactions, Figure 50 is a

diagram that indicates the incorporation of different technologies such as iPads and projectors as interaction modules into the booth. The diagram relies on the rendering of the digital model of the InstaBooth structure to allow for the depiction of how such technologies could be embedded into the structure. This diagram raised practical questions as to how the technology would be wired in, how it would be fitted, protected and secured into the structure.

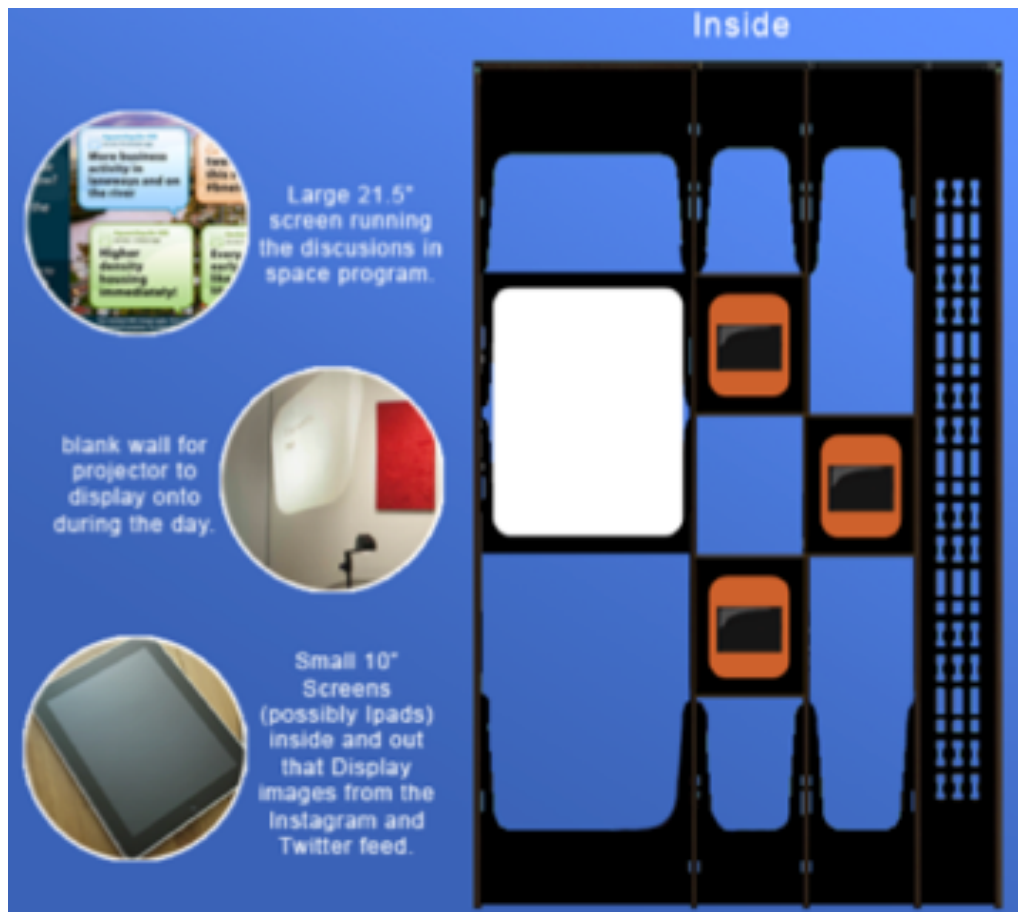


Figure 50. Envisioning the embedding of technology. Photo Credits: Ben Carden

The outcomes of the third design workshop indicate that there is further potential to develop more interactions that could be employed in the InstaBooth. The co-design workshops were successful mechanisms to generate and explore a range of ideas and to acquire input from participants outside of the initial design team which supports Steen’s argument that through a process of co-design, users could be seen as experts in the act of mutual learning with designers and planners who could benefit from the (tacit) knowledge of users into the research and design process (Steen, 2011). The contributions of the different workshop

participants have been valuable additions to the design development of the structure, the interactions, and performativity of the InstaBooth.

Acknowledging that the two distinct fields of architecture and interaction design largely informed the workshops and the design process is worth reflecting on. Although both disciplines work with similar design tools such as paper, pen, and cardboard and use similar forms of communication such as sketches, drawings, and models there are very different approaches to design from each field. The issue of scale is an initial departing point. Due to the large scale of buildings and structures architects and interior designers rely on scaled models and drawings to explore designs. Interaction design is much more concerned with the human experience and tends to operate at a scale much closer to the human body. The focus in architectural design is generally on form, function and context of the site. The processes through which architects approach design are varied and loose largely dependent on previous experience from education, training, and practice. Mentoring also plays a large role in the process where much is learned from peers and supervisors or tutors (Cossentino, 2002).

When comparing to interaction design the architectural design approach is not as formal or structured, this does not mean its not as rigorous but largely more of a personal experience. The interaction designers employed and introduced into the workshops notions that were novel to many of the architectural and interior designers such as bodystorming, iterative prototyping and experiential design. Interaction design as a discipline is characterised by an immediate concern for the needs of the individual user and their contextual setting. Iterative prototyping approaches such as body storming and building interactive prototypes at different levels of fidelity reflect the fact that interaction approaches cannot be envisioned at the start of a project but needs to be iteratively developed in stages. Research into participatory and co-design provides insight into how to effectively involve a range of stakeholders in the design process.

The combination of interaction and architectural design methods allowed the team to quickly cross physical scales and materiality swiftly. An important characteristic of the full-sized model in this respect was that it supported the expertise (and non-expertise) of different disciplines in different ways. For the interaction designers, where there is less disciplinary emphasis on spatial relations, the full sized model provided a direct experiential

understanding of how big the booth needed to be and how the various components of it would be arranged spatially. For architectural and interior design, the model allowed for the interactive components to be sketched in cardboard and ‘acted out’ without the need to worry about details of user interface or technical functioning. In this way, the physical model provided a common ground that supported design discussions across disciplinary boundaries.

Fabrication of the InstaBooth

The design workshops were followed by a series of meetings where the core team had to compile and process their outcomes to reach a final design of the InstaBooth structure. The design decisions were based on the need for a portable, flexible and lightweight structure. These factors informed the selection of materials and construction techniques. Allowing for the sharing and modification of the design with our international colleagues the design files were created in AutoCAD, a common engineering and architectural drafting software. These files are also readily used in digital fabrication techniques such as CNC machining of the structure. Prior to fabricating the actual structure a scaled model was created using the laser-cutting machine, Figure 51. This model provided the last opportunity to revisit the design, approve the aesthetics, the structural integrity and construction system of the InstaBooth.



Figure 51. Laser cut model of the InstaBooth. Photo Credits: Anna Svensdotter

Using 21 sheets of 17mm black Formply the InstaBooth was CNC routed at the QUT School of Design digital fabrication laboratory, Figure 52. Based on furniture construction methods the structure requires minimal fixtures, is flat-packed, and slots into place.

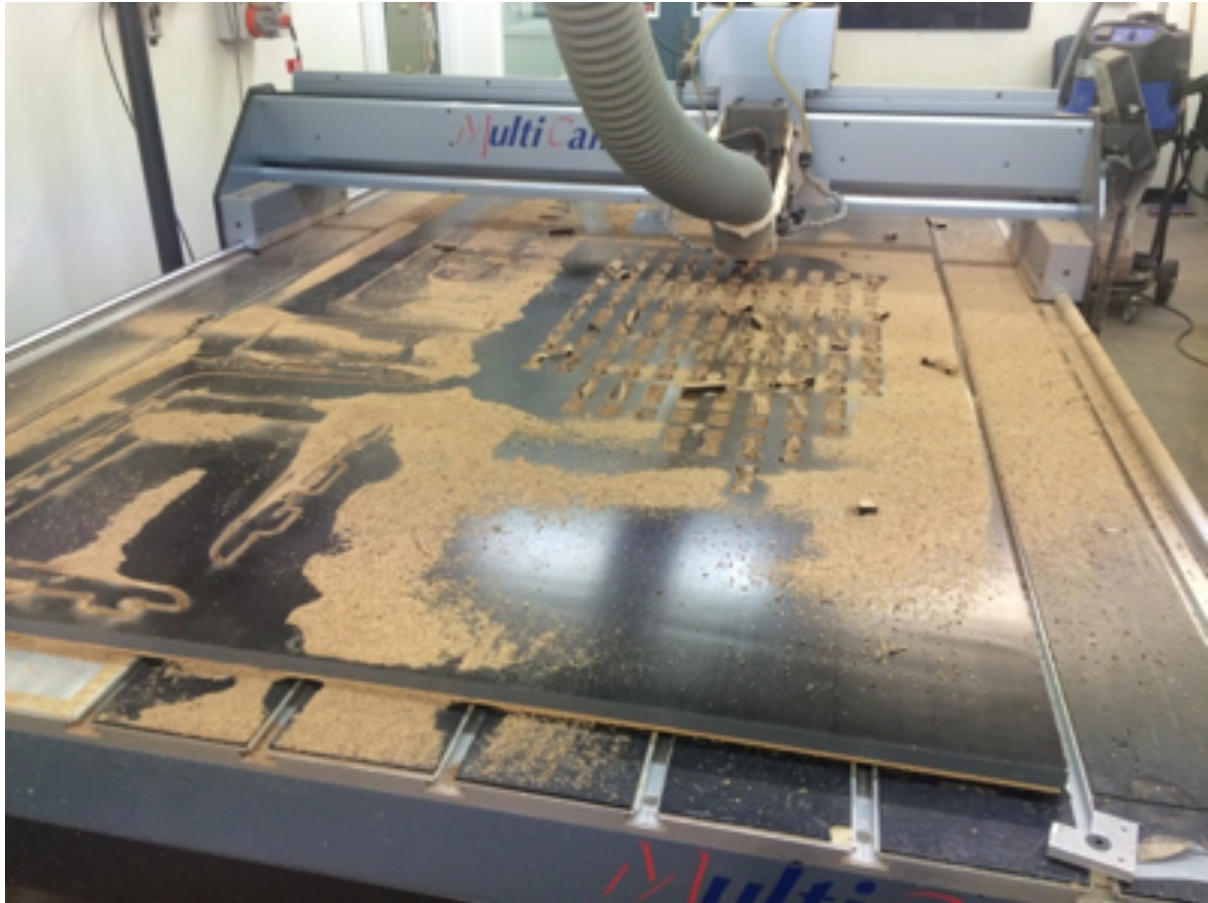


Figure 52. CNC machining of the InstaBooth. Photo Credits: Glenda Caldwell

Relying on the school of design digital fabrication workshop was beneficial in keeping within our budget however proved to provide its own set of challenges. The school of design is comprised of seven different disciplines with over 2,000 students. Therefore resources such as the fabrication facilities are heavily utilised by the student cohorts and technicians are more concerned with the needs of students than the requests of academic staff. A research assistant who developed the CAD drawings oversaw the fabrication of the structure and kept the technicians focused on the large task at hand. Due to the high demand of the university facility the cutting of all the InstaBooth pieces was conducted over the span of two months, which could have been completed faster had we employed an external facility. The assembly system called for double-sided cutting of the Formply panels, which is a complicated aspect of the design and requires a skilful CNC technician. We see this as a design issue as it will limit the ability for others with access to CNC routers to successfully reproduce the InstaBooth in other locations. In future iterations this aspect will be addressed to simplify the cutting required. The doors and structure of the InstaBooth can all be flat packed and

transported in a truck or trailer. Assembly of the structure can take up to four hours and requires at least two people. More time or people may be necessary depending on the configuration of the interaction modules and the extent of technology to be used (Caldwell & Foth, 2016). The InstaBooth was assembled and ready for testing in public space at the end of April 2015 as seen in Figure 53.



Figure 53. The InstaBooth, Brisbane, Australia April 2015. Photo Credits: Xavier Ho

Lessons Learned and Future Direction

The lessons learned from the design and fabrication process are extensive. The architectural and interior design process that evolved during this project benefitted largely by exposing itself to the structured approach presented by designers and academics from the interaction design discipline. An example of which is that the co-design workshops were useful ways of allowing for the different people involved and interested in the project to work together toward developing the InstaBooth. This took the experience away from an individual process to a much more inclusive and open way of addressing architectural and interior design. Combining the perspectives of the participants from different fields of expertise informed design decisions and provided rich outcomes. By allowing participants to create the physical prototypes they were able to communicate across disciplines and engaged with different aspects of their diverse backgrounds. The creation of physical models helped test ideas and

increase collaboration across participants by promoting critical discourse regarding the overall design of the InstaBooth and its complexities.

A strength of our design process that needs to be highlighted here lies in the parallel development of the architecture and the interactive media. Due to the flexible nature of the InstaBooth, nothing is permanently embedded into the architecture so we cannot claim that the design was completely interdependent. However, acknowledging that the architecture was fully designed to facilitate the interchange of interactive media and the interactive modules support the overall design intent of the InstaBooth is critical and could not have been left as an afterthought.

Working with physical materials to prototype ideas was useful not only in communicating across disciplines but also in overcoming issues of scale, materiality, form and structure. This process highlighted problems and issues with the concept early on allowing for design responses from a variety of perspectives to occur quickly. Creating tangible results from each stage of the design process also assisted in maintaining the enthusiasm of the team. Although a version of the InstaBooth has been deployed in different locations, from each deployment we continue to gather input from local participants in the design and how we could continue to evolve it further. When possible we have addressed the suggestions or concerns collected from participants and keep adding to the InstaBooth to improve the experience for the next person and place.

Conclusions Towards an Open Media Architecture

By examining the trajectory of the Media Architecture Biennales in the past and exploring growing academic literature, it is evident that the focus of the discipline has gone from 1. *technology*, 2. *space*, to 3. *content* shifting the concern to 1. *content*, 2. *space*, and 3. *technology* (Haeusler, 2016). This trend suggests a growing line of inquiry around how to push media architecture beyond façades of entertainment or advertisement for more meaningful purposes, such as how can people learn, engage, or interact with media architecture. Our research and focus in the design of the InstaBooth, has been in line with this trend focusing primarily on the content of the media simultaneously with how the architecture facilitates and supports it, the impact on space, and lastly the use of technology.

In a previous paper we discussed the notion of DIY media architecture (Caldwell & Foth, 2014) proposing for a media architecture that is generated by the public itself. We argue that the InstaBooth is an example of DIY and Do-it-With-Others media architecture because of the co-design process and the ability for the users to be the content creators (Caldwell & Foth, 2014; Caldwell & Foth, 2016). The contribution we would like to make through this paper to the media architecture discipline is to extend the discussion beyond the final artefact to explore the meaning of the design process and how that contributes to a media architecture that has positive impact on the community at large.

The underlying design principals of the InstaBooth are its ability to be situated and respond to the local context, and sensitivity to place. We believed from the onset that the InstaBooth had to allow for a compilation of interaction modules that responds to the context. The ability to change the questions asked through it and the combination of physical or digital interactions needed to be flexible. The supported interactions not only contain the media but also allow for users to be media creators. It is through their responses, engagement and interaction with each of the questions that the users create the content. Due to the open and anonymous nature of the InstaBooth and its media the users also have the opportunity to be the content consumers. The level of creation or consumption is up to his or her discretion and interest. Designing to allow for flexibility of engagement while also integrating the physical structure with the interactive media was and continues to be challenging. However, what we have learned from this process and experience in creating the InstaBooth contributes to the growing discourse around the value and impact of media architecture, particularly DIY/DIWO media architecture.

The future directions of this research and project will focus on assessing the impact of a media architecture that is open to community control. At this point we can say that people from different communities respond positively to the opportunity to engage with and interact with media architecture for the purposes of having their say. Providing the ability to voice their opinions through a physical structure such as the InstaBooth and the opportunity to learn from others has been effective however what does this mean to the overall community, planning and decision processes, other buildings and streets, physical and digital infrastructures? What impact and ripple effects does a temporary media architecture

intervention have compared to a permanent one? What does the emerging field of media architecture mean to its ancestors in the fields of architecture, interior design, interaction design, urban planning and HCI? This paper presents a discussion focusing on the design process of a small DIY/DIWO media architecture prototype, which raises many larger questions about media architecture as an emerging discipline and are left to challenge future research in this dynamic and compelling area of design.

5.3 DIY / DIWO Media Architecture: The InstaBooth

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 5.3:

Caldwell, Glenda Amayo & Foth, Marcus (2016) DIY/DIWO media architecture: The InstaBooth. In Wiethoff, Alexander & Hussmann, Heinrich (Eds.) *Media Architecture : Using Information and Media as Construction Material*. DeGruyter. (In Press)

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDAL CALDWELL	Significant contribution to the planning of the paper, literature review, conducting the study, and assisted with the preparation and evaluation of the manuscript.
SIGNATURE	
DATE	18 July 2016
MARCUS FOTH	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript.

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

I wrote the book chapter with Prof Foth's guidance. Together we discussed the concept and the structure of the paper. He contributed to the conclusion, revisions and edits of the chapter.

Preamble

This book chapter was an invitation to explore further the concept of DIY/DIWO media architecture and discuss how such an approach could be created and implemented in public urban spaces. The chapter provided an opportunity to reflect on all of the deployments of the InstaBooth that had occurred between April - November 2015 and see how the InstaBooth stacked up to the guidelines that we proposed with the original DIY/DIWO media architecture paper in chapter 2.2. The chapter includes a summary of the DIY/DIWO media architecture theories and the design and construction process of the InstaBooth therefore the first part of the chapter is a repetition of the previous papers however responds to the research question #2, *How can a DIY/DIWO media architecture approach be implemented?*

Caldwell, Glenda Amayo & Foth, Marcus (2016) DIY/DIWO media architecture: The InstaBooth. In Wiethoff, Alexander & Hussmann, Heinrich (Eds.) *Media Architecture : Using Information and Media as Construction Material*. DeGruyter. (In Press)

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5.4 Enabling Creative Citizens to Co-create Place through Media and Architecture: The InstaBooth

Preamble

This paper refers to research question #3, *How does media architecture impact on place?* To respond to this question interview data from two different deployments of the InstaBooth has been transcribed and analysed to reveal what the InstaBooth meant to the different communities. These findings indicate that participants felt they could voice their opinions, they learned from others, and developed a sense of community through interacting with the InstaBooth. These factors indicate that the InstaBooth became a meaningful place that assisted to connect citizens with one another and enriched a sense of community.

Caldwell, Glenda (2016). Enabling Creative Citizens to Co-create Place through Media and Architecture: The InstaBooth. *City & Community Journal*. (Submitted for review).

Keywords

Creative Citizens, Urban Informatics, Media Architecture, Place, Sense of Community, InstaBooth

Introduction

It is evident that easy access to information through ubiquitous computing, mobile devices, and the web 2.0 have increasingly become a part of our daily lives, all of which affecting the ways in which we experience urban environments and interact with local communities. Figure 63 is an image of people walking along a footpath in Chongqing, China as an example

of how a city has adapted its physical infrastructure and even accommodated to pedestrians' use of technology while walking through the city.



Figure 63. Sidewalks for mobile phone usage in Chongqing, China²

This image indicates the impact that mobile phone use can have on urban planning and urban design however how does the use of technology impact on the creation of place? What does it mean to the communities of people who live, work and play in these cities?

Media architecture is defined as “an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or interactive behaviour,” (Brynskov et al., 2013, p. 1-2). The purpose of this research is to explore how a design intervention, which combines media and architecture, can facilitate the creation of place. Acknowledging that it is the memories and meanings that we attach to public spaces that create place (Carmona et al., 2010; Jackson, 1994; Trancik, 1986; Arefi, 2004), this article explores a particular facet of the emerging field of media architecture, “do-it-yourself” DIY/ “do-it-with-others” DIWO media architecture (Caldwell

² https://twitter.com/PDChina/status/510611759129174016/photo/1?ref_src=twsrc%5Etfw

& Foth, 2014; Caldwell & Foth, 2016 forthcoming) to uncover how such combinations of citizen focused design, can assist in developing and understanding community. Applying a “do-it-yourself” DIY/ “do-it-with-others” DIWO approach to the design process media architecture not only provides for a bottom-up outcome it seeks to allow a means of communication or expression for the public or local community (Caldwell & Foth, 2014).

Using a range and combination of technology and different media, the InstaBooth, a prototype of DIY/DIWO media architecture, was developed as a tool for situated community engagement. In 2014-2015 the InstaBooth was designed, fabricated, and deployed by a group of academics from the Urban Informatics Research Lab and School of Design at the Queensland University of Technology. It has been introduced to different communities around Brisbane and Southeast Queensland to explore the meaning and creation of place. Based on qualitative interviews with InstaBooth participants, this article uncovers their experience with the design intervention to question the meaning that such media architecture can provide to a community. The findings indicate that combining digital and tangible media with architecture can provide greater opportunities for the co-creation of place within urban environments by enabling a novel discussion platform and that different types of users engage with it for different purposes. This article not only informs architectural studies or urban design and planning it also informs the understanding of communities, the meaning of place, and how people feel about current communication opportunities around Southeast Queensland.

This research has emerged from urban informatics, which is the “study, design, and practice of urban experiences across different urban contexts that are created by new opportunities of real-time, ubiquitous technology and the augmentation that mediates the physical and digital layers of people networks and urban infrastructures,” (Foth, Choi & Satchell, 2011). In the following sections background information on the three broad areas of place, people, and technology, are reviewed to contextualize the research project and the theories that have guided its development and implementation.

Background Information

Place? Place Attachment

Place has been interrogated from many points of view including social scientists, geographers, planners, interaction designers, and psychologists. The work of Yi-Fu Tuan (1974, 1977) focused on examining how people attach meaning to place. He indicates that spaces gain value and develop into places by increasing personal use and growing knowledge about the location. Tuan argues that it's a steady evolution of growing experience that contributes to the added value of a place (Tuan, 1977). From an urban planning and architectural point of view the value of place is recognised as a desirable outcome when designing and creating urban environments (Carmona et al., 2010; Jackson, 1994; Trancik, 1986; Arefi, 2004). As the connection of people to digital spaces, such as Web 2.0, continues to increase through the use of mobile technologies we must acknowledge that digital spaces can also become places. Harrison and Dourish (1996) identify the establishment of meaningful spaces within digital space and argue that it's a critical aspect of interaction design. They state that the ability of users to participate, adapt, and appropriate place are contributing factors to the creation of place (Harrison & Dourish, 1996).

Defined by Altman and Low (1992), place attachment is an emotional bond between people and places that includes social relationships. This is supported by Massey who claims that places are "porous networks of social relations," (1994, pg 121) and that places are "constructed out of a particular constellation of social relations, meeting and meaning together at a particular locus" (Massey, 1991, pg 28 cited in Hubbard et al. 2004, pg 224). Of particular importance is the connection through memorable experiences, social relationships, or affinity to the particular location. Manzo and Perkins (2006) indicate that place attachments have been proven to affect larger communities by impacting on individuals and neighborhoods. It is place attachment, which drives people to care for their street, look after their neighbor, and participate in community activities (Manzo & Perkins, 2006). Therefore when we consider how to make better places it is important to consider what places mean to individuals, neighborhoods, and communities.

People? Sense of Community

Current literature indicates place attachment and a sense of community are often closely related when considering particular geographic locations (Pretty, Chipuer, and Bramson, 2003; Manzo & Perkins, 2006). A sense of community pertains to the social and emotional relationships that people have with others involving feelings of inclusion and belonging, shared interests or personal histories (Perkins & Long, 2002). Along with place attachment, Manzo and Perkins (2006) argue that a sense of community through social inclusion, connection, and trust contribute to the level of participation of individuals in community activities. This link to participation is a valuable concept that assists in urban planning initiatives and interaction design (Harrison & Dourish, 1996). In understanding a sense of community and place attachment it is critical to highlight that these are concepts that occur and mean different things to each individual or neighborhood, therefore it is valuable to acknowledge difference as much as similarity.

Manzo and Perkins (2006) propose a framework where the ideal conditions leading to positive community engagement rely on an individual's experience of their community and place through three different levels of interaction and interpretation; cognitive (place identity and community identity), affective (place attachments and sense of community), and behavioural (participation and action within the community). Undeniably not everyone feels place attachment or finds a sense of community and do not participate in community events or activities, however by understanding the benefits of these concepts they can be encouraged and supported further to increase participation from more people. Participation can create and underpin feelings of empowerment where people can feel a sense of control over their surroundings, *“shared emotional ties to places strengthen social relationships and collective community action even further”* (Manzo & Perkins, 2006 pg. 344).

Technology? Media & Architecture

Media architecture is an emerging discipline focusing on the architectural design of spaces that incorporate digital media (Brynskov, Dalsgaard, Halskov, 2013). Haeusler indicates that the use of technology has driven this emerging discipline, where the use of space and content creation were of lesser priorities (Haeusler, 2016 forthcoming). Technology in media

architecture such as digital facades, LED lighting, projection mapping and large urban screens have typically been used to support entertainment or advertising in public spaces. However there are a growing number of artists, architects, academics, and designers who are questioning the use of technology and how to make media architecture that is more meaningful or useful to the surrounding area and community. Haeusler (2016 forthcoming) proposes that the emphasis in the discipline has recently shifted to one that focuses on: “*Content (to design experiences that reflect the needs and interests of citizens) -> Space (to reflect location, cultural and political parameters) -> Technology (to use appropriate technologies to achieve the first two goals)*” (pg. 3).

In line with this shift and building on the notions of DIY urban design (Douglas, 2014), DIY citizenship (Ratto & Boler, 2014), and DIY urbanism (Iveson, 2013), we explored the driving forces behind the broader do-it-yourself (DIY) and do-it-with-others (DIWO) communities of practice to see what motivated them and what approaches they were employing to propose a more open and participatory type of media architecture, DIY/DIWO media architecture (Caldwell & Foth, 2014; Caldwell & Foth, 2016 forthcoming). The initial intention was to promote the sharing of information, engagement, or interactivity to allow for a media architecture that further enabled citizen control (Caldwell & Foth, 2014). During this process it became evident that the content creation of media has a much broader significance that goes well beyond the technology that is used in media architecture. Focusing our attention on understanding media as a term, which encompasses the different means, including the tools, formats, and materials, through which people communicate allows for the creation of architectural structures and spaces that can be appropriated or adapted by local communities.

There are two external research projects that were undertaken in parallel to each other and our own research project (during 2014-2015) indicating the growing trend of a trans, multi, cross – disciplinary approach to understanding communities and their use of different media. *The Civic Media Project*, edited by Eric Gordon and Paul Mihailidis in the USA, is both a website³ and a book released by MIT Press in 2016. The purpose of the project is to explore the use and development of digital tools to take action and engage in civic life.

“The Civic Media Project (CMP) is a collection of short case studies from scholars and practitioners from all over the world that range from the descriptive to the analytical, from

³<http://civicmediaproject.org/works/civic-media-project/index>

the single tool to the national program, from the enthusiastic to the critical. What binds them together is not a particular technology or domain (i.e. government or social movements), but rather the intentionality of achieving a common good... Most importantly, the CMP is meant to be a place for conversation and debate about what counts as civic, what makes a citizen, what practices are novel, and what are the political, social and cultural implications of the integration of technology into civic lives,” <http://civicmediaproject.org/works/civic-media-project>.

The CMP project includes four sections of case studies that are presented under the categories of: *Play + Creativity*, *Systems + Design*, *Learning + Engagement*, and *Community + Action*. These categories encompass and invite stories from many aspects of daily lives making the site rich in content and perspectives. Participation and its many facets are key concepts that the CMP project is based on. One of the facets includes “participatory culture”⁴ (Jenkins, 2010) that acknowledges people are active creators of communication media and have used a range of technologies from the printing press, to pop culture and the Internet, to share their messages beyond their local context and social networks. The uniting element to the different case studies is their use of digital media tools in some way. This may include social media, blogs, digital storytelling, photosharing or live events.

Another facet is participatory action research (PAR), proposed in a chapter of the CMP book by Foth and Brynskov (2016), as an appropriate methodology to study the creation, development, and implementation of civic technologies for community engagement. They argue that in order to truly reach across disciplines and understand the innovations that occur in civic engagement the study participants’ level of contribution is heightened to that of co-investigator (Foth & Brynskov, 2016). They cite Reason and Bradbury (2001) who discuss the process of action research as one, which democratically brings together reflection, action, and knowledge creation with others for the overall benefit of people and their communities. Ultimately the CMP project examines how people work towards inspiring, learning from and being active social agents.

⁴<https://www.youtube.com/watch?v=AFCLKa0XRlw>

Media, Community and the Creative Citizen was a research project funded in the UK through the Connected Communities programme by the research council to explore the value of creative citizenship through three streams; hyperlocal publishing, community led design, and creative networks⁵. The research project had several papers published, booklets and reports, blogposts, and media releases in addition to the release of the book, “*The creative citizen unbound: How social media and DIY culture contribute to democracy, communities and the creative economy*” edited by Ian Hargreaves and John Hartley (2016). Similar to the Civic Media Project, the Creative Citizens research focuses on communities and their use of digital media and other technologies with the intention of creating positive impact, however focuses specifically on case studies within the United Kingdom. One of the booklets “Creative Citizens Variety Pack” provides information on case studies that are grouped into three categories: Supporting Each Other Locally, Telling stories, Placemaking and Building skills through making together (Lockton et al., 2014). This booklet continues to discuss the use of digital media in regards to themes such as placemaking, participation, and community engagement. The research group defines Creative Citizens as people who do creative works such as baking, knitting, performances, etc. with a social, political, or civic element (Lockton et al. 2014).

These two research projects indicate that there is a wealth of knowledge creation and sharing occurring in different parts of the world surrounding similar issues and concerns. The information presented by both research groups highlights that citizens across the globe are grappling with what the use of different types of media means and how this impacts on communities. The will to create a better place for all is evident but what is that better place? How do communities see themselves and what are they seeking? How do they communicate their desires and concerns and what can they learn from each other?

The InstaBooth

In an attempt to combine the above theories, approaches, and processes a community engagement tool that combines different media types within an architectural structure and space was developed, the InstaBooth (Figure 59). The InstaBooth has been designed,

⁵<http://creativecitizens.co.uk>

fabricated and deployed to align with the DIY/DIWO media architecture concept (Caldwell & Foth, 2014; Caldwell & Foth, 2016 forthcoming) and relates to many of the case studies presented by both the *Civic Media Project* and the *Media, Communities, and Citizens* research groups discussed previously, as it purposefully stimulates creativity through the sharing of ideas and concerns via digital and physical media.

Fundamental to the project is participation, its design process relied on participatory design and co-design principles (Bodker & Pekkola, 2010; Sanders & Stappers 2008; Muller, 2003; Muller & Kuhn, 1993), while the sole intention is to generate situated community engagement from all aspects of society. Its aim is to give a voice to communities who can share their thoughts and ideas in an unstructured and playful way. Its modular design accommodates a range of bespoke interactive technologies, both analogue and digital, designed to facilitate the engagement process by providing means to present different materials and offer different ways to collect feedback (Johnstone et al., 2015). The appearance and interactions of the InstaBooth are designed to appeal to different demographics and foster an interactive discussion about a range of different topics such as change management, policy development, and urban planning. The InstaBooth fosters creative citizenship where the discussions generated by participants concern different aspects of community life including social, urban, cultural and political issues.



Figure 64. The InstaBooth at the ABC studios, Brisbane, QLD.

Research Design

The InstaBooth was deployed in seven different locations across South East Queensland between April to November 2015. In this article two of the deployments are discussed in detail to examine the research question: *How does DIY/DIWO Media Architecture impact on place?*

Brisbane Writers Festival

From 17 August to 6 September 2015 the InstaBooth was invited to participate in the Brisbane Writers Festival (BWF). The festival is a yearly event that takes place at the State Library of Queensland. The theme of the festival in 2015 was *Minds Wide Open*. One of the key events as a part of the festival was called “Brisbane 2050: Imagining Our Future City” which presented a panel of experts including Bernard Salt, Elizabeth Farrelly, Geoff Woolcock, Andrew Gutteridge, and Marcus Foth, with urban planners, artists, economists, and community leaders who discussed the future of Brisbane for 2050 with the broader community⁶. The InstaBooth project and team were invited to support the event by assisting the BWF to conduct community consultation to gather data supporting the discussion around Brisbane’s future. Prior to the festival’s commencement the InstaBooth was situated in the foyer of the Australian Broadcast Corporation’s (ABC) studios in South Bank, Brisbane and was promoted through the ABC media channels, including radio and online publications⁷.

⁶<http://bwf.org.au/events/brisbane-2050-imagining-our-future-city/>

⁷<http://www.abc.net.au/local/stories/2015/08/05/4287289.htm>



Figure 65. The InstaBooth at the State Library of Queensland

During the festival the InstaBooth was located at the State Library of Queensland alongside the rest of the festival program and events (Figure 65). The Brisbane Writers Festival volunteers assisted in attending the InstaBooth at both locations. The InstaBooth was set up asking a range of questions to stimulate discussion and responses around what people wanted to see for the future of Brisbane in 2050. Six different interactions were set up within the InstaBooth each one asking a different question around the topic and provided different mechanisms and media through which participants could respond including writing a note, drawing a picture, tweeting or texting a response, dropping a physical pin on a corkboard, dropping a virtual pin on a google map, or voting for pictures via an Instagram feed. All of the responses were collected in an anonymous manner and most of which were visible to

other participants by pinning responses to a cork board, pegging drawings to a clothes line, or displayed on a digital screen⁸ as seen in figures 66a and 66b.

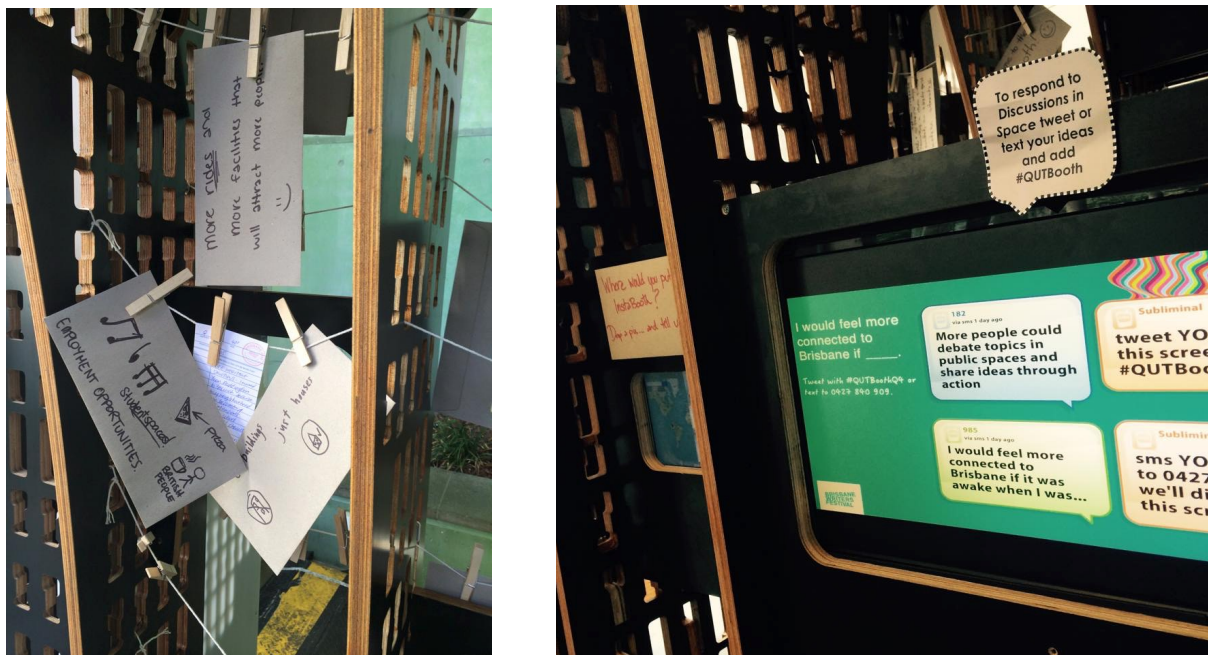


Figure 66. a & b Responses on display within the InstaBooth at the Brisbane Writers Festival.

Pomona

From October 17-21 2015 the InstaBooth was placed on the main street in the regional Queensland town of Pomona as seen in figure 6. The local community group, Heart of Pomona, invited the InstaBooth project team to assist in conducting community consultation around the future vision of Pomona. The results of the consultation were to be presented to the local council to inform the development of the upcoming Pomona master plan. The configuration of the InstaBooth was similar to the Brisbane Writers Festival deployment where the questions and interactions promoted discussion for the future vision of Pomona. In both deployments the project team worked closely with the community stakeholders to create the questions that were being asked and the best way to present them to participants through the graphic design of papers, materials used and the digital interactions.

⁸<https://vine.co/v/eD15IYxgIPL>



Figure 67. InstaBooth in Pomona, QLD

To examine how the InstaBooth, a form of DIY/DIWO media architecture impacts on the feeling of place and sense of community 28 different users were interviewed during the BWF and Pomona deployments. Participants included 8 males and 20 females ranging from the ages of 18-75. Interviews were semi structured and conducted by the research team after users engaged with the InstaBooth and have remained anonymous. The names used in this article are fictitious. The interviews varied in length from approximately 5 minutes to 25 minutes. This article focuses on the responses of participants to the questions: *What did*

interacting with the InstaBooth mean to you? Did other people's responses influence how you interacted with the InstaBooth?

The qualitative method used to analyse the interviews was thematic analysis to identify an emerging pattern of reoccurring themes within the data (Braun & Clarke, 2006; Vaismoradi et al. 2013). An inductive approach was applied to the transcribed interviews following the process outlined by Braun and Clark (2006), which includes: 1. familiarisation with the data, 2. initial coding, 3. searching for themes, 4. reviewing themes, 5. defining themes, 6. reporting findings. As a result of the analysis procedure when examining the responses to the question; *What did interacting with the InstaBooth mean to you?* four categories of meaning were identified and are discussed in further detail. Analysing the responses to the question; *Did other people's responses influence how you interacted with the InstaBooth?* allowed for the identification of different InstaBooth user types. To support the identification of the user types the drawings and responses collected through the paper interactions within the InstaBooth were used for cross referencing.

Findings

The structure of the findings section is based on the work of Manzo and Perkins and their framework using *cognitive, affective and behavioral* dimensions (2006). This reveals two layers of the data, perspectives from the individual and on the community. When people were asked what the InstaBooth meant to them, through thematic analysis the following themes emerged: *providing a voice, place of learning, feelings on community, hope for the future*. The following sections discuss each of the categories in more depth.

Cognitive Dimensions

As described by Manzo and Perkins the cognitive dimension refers to “one’s sense of self as informed by neighborhood places and by social interactions/neighborhood respectively” including place identity and community identity (pg. 344).

Providing A Voice

People perceived the InstaBooth as providing a voice for their concerns, issues or ideas, it became a place in the public space which allowed them to find a sense of expression and a vocalized senses of themselves. This became evident as participants frequently referred to the InstaBooth using terms such as: *listening post, forum, platform, soapbox, physical petition, venue for discussion, and arena*. Each of these terms refers to some aspect of vocalizing and sharing ideas with others.

The following participant referred to the InstaBooth as somewhere to go to and have a say. *“Yes, it (the InstaBooth) was somewhere like when you’re seeing things happening within your own suburb, that you don’t think anybody else is looking at it the same way or there’s nowhere to address it to. This was somewhere where you could have a say and it’s accessible,” LucyBWF.* Lucy indicated that she had heard about the InstaBooth through the ABC radio station and she purposefully went to the library and Brisbane Writers Festival to find it. She wanted to see it for herself and to have a say because she felt there is nowhere to address her feelings about what is happening around her neighborhood.

Another user viewed the InstaBooth as an opportunity for people to share their ideas in a public space. *“...I talked about...opportunities for people to put their ideas out there in public spaces...a forum where people can come and talk about...their ideas for Brisbane. I know there are meet up groups... but I think people are still shy to get involved in that way. I think if there were people physically in a space...whether it’s to debate making spaces or activities, then people will more likely come and sign up for it rather than getting online. I think people get online and sign up and then they go...” SandraBWF.* Sandra referred to the InstaBooth as a “mechanism” or “forum” where people can talk about the future of Brisbane in an open way. She saw the InstaBooth as something that even shy people could use to share their ideas as an outdoor dialogue that is different to something that is facilitated through an online presence or meetup group. Sandra was aware of the physical nature of the InstaBooth and how that provided a different experience than a digital or virtual space.

“I think it’s not so much technology. It’s just the fact that you have a listening post. That’s the thing. It’s critical that you listen. I think there needs to be more of it. Often I find, with a lot of government things now...if they listen more to the community and took more broader ideas and actually sought ideas rather than waiting for people to come in,” MartinBWF. From

Martin's point of view, it was not the technology of the InstaBooth which mattered to him, it was the concept which he found most intriguing. He called it a "listening post", and saw it as an opportunity or a mechanism to capture the ideas and comments of the people and through it others could listen.

In the following excerpt George talked about the InstaBooth as a platform, a soapbox and a petition. In his comments he summarised how many other people saw the InstaBooth and how it could be used by society. *"I think put the opportunity, put the platform out there. People always need a platform to air their wants and needs and their voice. If you can get enough voices, I mean look at the power of petitions on the internet, I mean if enough people say the same thing, enough people agree on the same thing, then as far as I'm concerned this is a petition in real life in the box,"* GeorgeBWF. This statement about the InstaBooth being "a petition in real life in the box" is powerful and signifies that he saw the InstaBooth as being something much more than just a box with pieces of paper in it and iPads. George viewed it as an opportunity where he could see the potential of allowing people to share their ideas through the InstaBooth and that in the end some change could occur as a result from it.

The characteristics of the InstaBooth that people referred to which helped them to view it as a mechanism to collect and share their voice pertained to its open and neutral agenda. *"What it means is that... the booth doesn't push an agenda. I think that's the important thing. It just prompts people to think and respond. It's not as though it's been pushed a particular way or it doesn't have any sort of limits. It allows people to allow the limits of their imagination and their thoughts. Judging by the conversations I've had with people after they've interacted with the booth, it has stimulated an ongoing discussion, I think, in the community beyond the booth,"* BPomona. This participant indicates that the conversation encouraged by the questions asked through the InstaBooth had continued outside of it indicating that its impact had been felt through other parts of the community.

The InstaBooth meant to Rebecca a couple of things; it was a connection to people outside of her community and that it was a way for people to record their thoughts. She saw it as a vehicle for making change based on identifying the issues that people have with their town and allowing people to speak out. She did not remember there being anyone else asking before or a way to provide their thoughts.

“It meant ... I think there was a connection between someone such as yourself from QUT and the general public here. That we can put our thoughts down, which I don't remember being able to do anywhere else on any other platforms, so I thought this has opened up a whole new avenue of moving forward with some of the issues in Pomona and bringing some things to light that perhaps people don't like to speak out. This has helped, I think, quite a few people put some things down on paper and not be fearful of retribution or, ‘Oh my gosh, I shouldn't have said that,’ or ‘Should I say that?’ it's a nice friendly way to ask the public to put some of their ideas to paper,” RebeccaPomona.

Rebecca did not seem to be too concerned with the technology within the InstaBooth but focused her comments more on the process of writing on paper as an official way to record ideas. She talked about openness and honesty, that people did not feel afraid of the consequences because the InstaBooth provoked a sense of friendliness that inspired the sharing of authentic ideas. Rebecca recognised that the purpose of interacting with the InstaBooth was not individualistic but for the common good of the greater public.

“I did look at quite a few of the notes that were there. I sort of agreed and disagreed with some... I liked the fact that people could disagree with a comment. I thought that was very, very clever ingenuity there...It appears to me as a booth that asks for your opinion. I think you should freely give your opinion no matter what anyone else says I guess,” SandyPomona. Sandy mentioned the ability to disagree with other people's comments. This to her was a novel opportunity to do so in public and found it appealing describing it as “clever ingenuity”. Because the InstaBooth allows people to write they can comment on what other people say, and this allows the extension of the conversation to go beyond a like or a swipe, people can share their opinions in an open way which Sally appreciated She also mentioned that the other people's comments didn't influence her, she believed people should share their individual opinions regardless of others.

The benefit of the InstaBooth is that it is a structure designed to display and share the ideas with others. The InstaBooth does not pertain to a city council or a political party, it was placed in public spaces for people to use. From the interviews it became clear that people appreciated that it is open and visible yet anonymous, providing them with an opportunity to voice their opinions. They tended to feel comfortable with it and felt that they could be

honest about sharing their thoughts even acknowledging that they had the ability to disagree with others.

Place of learning

Many of the participants revealed that the InstaBooth allowed them to see things from the different perspectives of others which in turn prompting new ways to think about certain issues or ideas therefore informing their own sense of being. Through the ability to view other people's comments users learned new things about other members of society and their community while also learning about themselves. Some of the users talked about the InstaBooth causing them to "think outside the box" or that it "stoked my thinking".

The following is a quote from George who expressed the inspiration he received from someone else's comment. *"There was another sort of a multi-cultural comment on there which kind of stoked my thinking as well. I had to agree that it's something I'd really like to see..."*GeorgeBWF. In the quote he says "stoked" referring to something that actually fueled his ability to think differently or see things in a different way. This indicates that he was learning from the comments of others and explains what he means by stoked thinking.

Another participant described the "prompting of ideas" that occurred to him while he was interacting with the InstaBooth. *"Well when I had an open question, that's when I started ... writing, started putting down things like... I think more green spaces was prompted. It was an accumulation of things. I got prompted by that one and I went on the other one which prompted a few other ideas. It was a bit like getting a thought running when you're starting to write,"*MartinBWF. Martin talks about writing his response to one of the questions, which caused him to think about a range of different issues providing a flow of ideas. He felt inspired by the booth, the questions that were asked, and how they were asked. He seemed comfortable and responsive to it, through that process it appears he may have learned something about himself.

The manner through which the questions were asked and providing different media for participants to interact with appeared to inspire thoughtful feedback. *"I think having that*

availability of pick and choose which ways ... which methods you want to choose would really kind of stoke people's thinking and sort of get them thinking a bit more outside the box," GeorgeBWF. In this quote George referred to the different methods of communication through the InstaBooth that helped people to think "outside the box" about the actual responses they were leaving behind. Another participant reinforces this statement by also discussing the creative elements of the interactions within the booth that caused her to think about the questions being asked in a novel way. *"I guess it made me feel like I was heard. Also it's a creative process too so it made me think outside the box," KylieBWF.*

The participants have acknowledged the creative process of interacting and providing responses to the questions as a means through which they were able to find different perspectives towards the issues discussed within the booth. The inspiration participants found from the responses of others also enriched their experience within the InstaBooth and many indicate that they learned about the community and what other people desired. The ability to freely share ideas with others through the booth created a place of learning about individuals and how they see the world around them, how these views compare to the views of others, and about the community as a whole.

Affective Dimensions

The affective dimensions refers to the emotional connections to a neighborhood or neighbors. It also includes the emotional relationships to people created within particular places, also known as place attachments (Manzo & Perkins, 2006).

Feelings on community

During the deployments of the InstaBooth at both the Brisbane Writers Festival and in the town of Pomona the questions being asked through the InstaBooth were relatively the same focusing on creating a discussion on the future of the city or town. This line of questioning inherently caused people to reflect on their existing relationships with their city, town or neighbor. The discussions that emerged in both deployments brought about a range of issues and concerns that broadly included sustainability, infrastructure, politics, human rights and

urban planning however what was a valuable finding for this research was the frequent discussion about the local communities.

The InstaBooth created a space for many people to stop and think about the place in which they live and what it meant to them. This participant revealed her thoughts and the importance of a sense of community. *“Just really stop and think about what I did like about the town. I guess when you live in there, you can just get caught up in your day-to-day activity, so it was good to reflect and really analyse what is important to me in a sense of community and what maybe can be done better, especially having young children, thinking about their needs being in a small town as well. No, I think it’s a wonderful idea. I think it’s a good thing for a lot of communities to do, especially these more sort of rural areas because they tend to have a massive growth without the infrastructure necessarily being there...I guess it would probably help to get a nice packaged idea of what the community feels that it could maybe be presented to some politicians. I guess it’s a bit more of an objective measure than just a few people complaining or the Chamber of Commerce complaining because they’re considered to have a vested interest in business,”* KyliePomona. In this interview with a mother and her young son, Kylie expressed her concern about the sense of community and how it could be better for the young children in her life and in the town. She was worried about their needs as well which indicates that she felt that children are often overlooked in the planning process. She talked about taking a moment out of the day-to-day activity that is easy to get caught up in. This was an opportunity to think about her town in a different and focused way, therefore the InstaBooth provided her with a thinking space and place.

Other participants talked about the ability to be involved in the discussion about their community. This participant was pleased to provide her thoughts through something other than a survey or focus group. *“We loved the way that we could actually be involved. We were asked what we thought and loved walking through the...very interesting structure, and rather than just fill in what you think, it’s been provided in a very interesting way. You can see what other people have written and get ideas from that of course,”* JenniferBWF. Jennifer felt that through the InstaBooth she became a part of a larger discussion, which she hadn’t been able to do in the past. The structure was interesting to her, and found the ability to interact with the

InstaBooth in different ways appealing. She appreciated seeing and reading what other people had done and their ideas stimulated new thoughts to emerge.

Many of the participants saw the InstaBooth as something, which reflected the feelings or sense of community of that location. For some it reinforced their thoughts and others found a greater appreciation of their local community. By collecting the voices of the people who use the booth, whether it be through their written notes, drawings or tweets, the InstaBooth acts like a mirror providing a way for the community to view itself. It is by stepping away from every day life, finding the time and space to have a moment to consider place specific questions in a neutral way that the participants were able to learn about one another and themselves.

Hope for the future

The questions asked through the InstaBooth were about the future of Brisbane and Pomona. Many of the responses dealt with notions of time however it was through the interviews that participants expressed that the InstaBooth symbolized a feeling of hope when considering the future. *“What did it mean to me? It meant hope. It actually was a hopeful experience because it was a vision I think of the future. It employed all different varieties of mediums to engage with that... I had to let go of my preconceived idea about having to do things a certain way to conform to whatever category I was working with. At the end of the day, all I really needed to do was leave a comment in whichever medium I felt comfortable, so that was great. Once I discovered that, I was a lot more relaxed about the whole process but initially it was daunting. But at the end I felt this was hopeful because it gives everybody...it gives a broad range of options to people to engage with the InstaBooth to be able to leave a comment,” AmandaBWF.*

The link between the vision of the future and asking people their thoughts for the future filled Amanda with hope. It was not only the questions that were asked but the different media through which they were asked and collected that instilled this optimistic view. Amanda discusses how she had to realise that she had preconceived ideas about how to engage and interact with the InstaBooth but when she discovered that she did not have to conform to any

prescribed way of responding she seemed to have been able to engage with the InstaBooth in a more meaningful way. The feeling of hope also stemmed from the fact that she could see how the InstaBooth could engage with a variety of different people, there are options for everybody, anyone can leave a comment.

Amanda's experience is similar to others where they find the InstaBooth as a space to allow for thinking about things around them, about the city, what aspects they like, don't like, what can be better and mainly in this instance how they would like to see the future of their town or city. For most of these people the future of Brisbane or Pomona is closely intertwined with their own futures and how they experience the city plays a role in how people feel about their lives, and their own positions within society. Even though through the InstaBooth many people found things to dwell on that they are unhappy with, Amanda saw it as a symbol of positivity. To her a shared conversation about the future is hopeful because it means that there are people who are concerned with improving the city, which could lead towards a brighter future for everyone. Even though there are no immediate effects or solutions that were happening as a result of people's contributions to the InstaBooth, that did not seem to matter to most people, they were happy to have an opportunity to say something, to learn something from others.

In the interview with George he acknowledged the different beliefs and words that people may have used but ultimately they meant the same things, wanting to live in peace, to have security in their lives with the people they love. *“Especially with the refugees in Europe I think it was. Been following that pretty closely and it's such a depressing scene really. All these people want is to live like everyone else. They want to live in peace and security and want to do the things they enjoy with the people they love. Everyone wants these same sorts of things we just use different words and have different beliefs to get there...I think even now, here it's sort of...curiosity that people come but in there it could actually be a really good, powerful tool for change, and once people know it's there I think they will absolutely flock to it,”*GeorgeBWF.

George recognised that the InstaBooth is a curious device to the Australian public but in a location in turmoil such as with refugees the InstaBooth could become a *“powerful tool for change”* as it would allow people to say what they want. This ability to share their desires

and ideas is something that would be attractive to others and could be a useful tool to stimulate change. George continues, *“I think we all want the same thing, is just to be happy and healthy and to feel like our voice actually matters and that we're not just, you know, our wants and needs and desires are not falling on deaf ears. I'm actually looking forward to seeing where this would go. Where are these opinions going to make a change later on?”* George said that ultimately everyone wants to be heard and that hopefully someone out there is listening to his or her desires and hopes. He indicated that he is looking forward to seeing where the InstaBooth and the debate that arises through it will go, alluding to the potential of learning from others, or seeing where change could be made through voicing one's opinion or listening to the opinion of others.

Behavioral Dimensions & User Types

The behavioral dimension regards *“socially oriented behavior”* such as participation in neighborhood activities including planning or development engagements (Manzo & Perkins, 2006). The interviews provided insight into the different types of people who engaged with the InstaBooth and their motivations for interacting with it. The four different user types that have been identified are: *advocate user, learner user, playful user, and the curious user*. This is not an exhaustive list but indicative that there are different purposes and motivational factors that influence how people interact and respond to the InstaBooth. Distinguishing the different user types was primarily based on their responses to the question regarding whether other people's responses influenced their own. Some participants can be a combination of user type such as both an advocate and a learner. Acknowledging the user types assists in identifying the needs of different people who make up the complex ecosystem of communities.

The Advocate User

In some instances participants self-identified themselves as advocates and it was from this initial finding that the identification of the different user types emerged. The advocate user predominantly responded that their interactions with the InstaBooth were not influenced by the responses of others.

This is an excerpt from an interview with a participant who adapted the InstaBooth interaction capability to suit her needs. When she was asked why she did that her response was, “...because I’m an advocate for community media and I want to expose community media because I think it’s great, it’s independent, it’s really creative, so I made my mark ...” *SandyBWF*. This participant described herself as an advocate and used the InstaBooth as an opportunity to show her advocacy. She adapted one of the interactions by placing her note on it when it was not designed to have papers attached to it, and refers to this as “*I made my mark*”. This was intentional, almost as if she had done graffiti on the InstaBooth, but in a temporary way to ensure that other people saw her message.

Many of the advocate users were searching for such an outlet and one lady was even happy to get her concern “off her chest” and others made it evident they had something very direct to say through the InstaBooth. The advocate user tended to seek out the InstaBooth where many of them had heard about it and had come out just to find it and use it. In the following excerpt the participant knew what she wanted to say through the InstaBooth and that she specifically sought it out to voice her concern about the future of Pomona. “... *I had a fairly clear view of what I was going to say and I’ve come down here deliberately to see you...It’s nice to have an opportunity to have a say. Whether any of it will get taken notice of, I don’t know, but I hope so. I don’t want Pomona to turn into another great big schooling/housing estate kind of thing and lose all its character and charm,*” *ClarePomona*.

The advocate user type is labeled as such because these users tended to have their own issues that they were passionate about and were fighting for. They were seeking an outlet to advocate for such issues as: politics, urban planning, public transport, public events, human rights, refugees, gender equality, media, urban design, sustainability, and the natural environment.

Learner User

The learner user is the participant who may say yes that they were influenced by other people's comments or that they were interested in seeing and reading other people's responses to be inspired by or learn from. The learner user is more difficult to identify without the interview data or by relying solely on the drawings or written responses collected through the InstaBooth. The interview question allows the participant to indicate what was motivating their interaction with the InstaBooth and what they got out of the experience.

The following excerpt is an example of a learner user who mentions they learned something through the InstaBooth and they were able to identify that for themselves through reflecting on their experience within it. *"I learnt and reflected... there are a lot of things missing... I thought a lack of community facilities. I think we still have a commercial focus rather than community focus, and I think we can do a lot more by putting in community heart. That was my key recommendation because I think it's something that can drive it. It can be more efficient and can benefit the community,"* MartinBWF.

Another participant talked about how she learned about others by listening to the conversations occurring within the InstaBooth. *"I just learned about some things...I'm hearing conversations. So that really is a positive thing. It's interconnecting, this booth, I think it's a wonderful thing. I think more of them, city and...because everyone has their little areas, you know?...So I think it's a great thing to have. It's more personal. It's a great arena that you don't feel inhibited or anything. I like it. It's friendly. It's nice,"* RebeccaPomona. In this quote the participant says she feels connected to other people and refers to the InstaBooth as interconnecting. Rebecca felt that the InstaBooth is creating conversations and through those she is learning about other people and says that it is a positive experience. She suggests having more booths around the city so that more people have an opportunity to use it.

Playful User

The playful user tends to be drawn to the InstaBooth's novel design or interactive components and see it as a fun object. These users may not be too concerned about the actual

questions being asked but appear to be more interested in playing with the technology or drawing pictures. The playful user can be identified through the interview but also through the drawings and types of responses they leave behind. From observations and through the interviews the playful user tends to be of a younger demographic and more comfortable with the technology in the InstaBooth.

This participant who was of an older demographic was surprised by the fact that she enjoyed playing with the technology within the InstaBooth even though she was uncomfortable with it as it was something unfamiliar to her. *“Oddly enough, I actually enjoyed the Google maps and playing around with that trying to work out how the jolly thing worked and how I could best engage with it. It was a bit of a challenge to me to try and see how I could understand that whole process and how I could best use it to provide feedback because I wasn’t comfortable with it. It was a bit of a challenge,”* AnnaBWF. She relied on a sense of playfulness to help her work out the process and find a way give her feedback successfully.

The following quote from another participant reveals that she perceives the InstaBooth as an opportunity to stop and think about things such as hope, which she sees as a fun experience, *“I thought it (the InstaBooth) was fun. I just thought it was fun and novel, so that was good. I think we need more fun, more novelty at times. If you’re feeling too serious about things then have a chill out and think about hope, that’s fun,”* AndreaBWF. The topic of fun was mentioned frequently in the interviews and most people agree that as a society most people don’t have enough fun in their lives. These users tend to see the InstaBooth as something new and the playful process of discovering it and interacting with it can be fun. While they are having fun and being playful they are learning things about themselves and others, they are sharing their ideas and this to them is a meaningful experience as contributing to the conversation or discussion about the future of the city is important to many people.

Curious User

Different to the playful user, the curious user type did not necessarily interact or engage heavily with the InstaBooth however they tended to be interested in it as a concept and were intrigued by what it was doing, why it was placed there, and what it was for. This type of

user was difficult to identify through the comments left behind within the InstaBooth and was mainly identified through the interview transcripts.

This participant demonstrates the curious user in his response to why he came to the InstaBooth and whether he knew about it before hand. *“Just word of mouth. I thought I’d just pop down and see what it was all about. I didn’t really know. I thought it was council until I got down here type thing,”* FrankPomona. His responses overall were skeptical of the InstaBooth and its purpose, mainly that he did not see it making any impact or change within the community. He only responded to one of the questions within it however he was quite concerned about who was going to look at the response he left within the InstaBooth.

The curious user often did not engage with the InstaBooth however from our observations and experiences there were many people who would ask us what it was about and then leave. Others would stand back and just watch people using it. It is valuable to recognise this user type because they make up a large portion of the community. Capturing their interest is a challenge and exploring design practices or approaches which would increase their interaction with engagement tools is worth pursuing further as these user types are often the ones who express themselves the least.

Discussion

The recent research of York Cornwell and Behler (2015) propose, “that neighborhood context structures an individuals’ personal social network,” (pg. 329). The size and strength of social networks created within a neighborhood is based on several factors including socioeconomic status, gender, age, and proximity to community based institutions (York Cornwell & Behler, 2015). Therefore, an individual’s experience of a community differs from one person to the next as their personal networks vary. From the findings of the research presented in this article, it became evident that in the city of Brisbane many people are feeling disconnected from a sense of community and that they are not part of the larger conversation that they believe is occurring particularly around what the future of Brisbane will be like. In an

interview with Martin, one of the participants from the Brisbane Writers Festival, he talks about the lack of sense of community he feels.

“Well I think the key thing is how can we be a better community?...I think a lot of things that break down in community...there’s increasingly things like refugees, people getting poorer, people getting wealthier, middle class people, people who don’t know each other. Brisbane used to be a smaller city, that there’s no longer that communal thing as much...I mean they’re in groups, like clumps and things like that, but I just don’t see that community that you might have in a small community...But I don’t feel that ... you lose that in the big city but can they bring that back somehow? Can they get that communal feel?...genuine community engagement with other people and learning more,” MartinBWF. Martin feels that communities in big cities are breaking apart due to the great range of needs that people have in today’s society. He remembers the city of Brisbane feeling more communal but now that it has become a big city that community core has been lost, which is in line with classic urban theory (York Cornwell & Behler, 2015). Martin thinks that meaningful experiences such as learning are a part of genuine community engagement.

The deployment of the InstaBooth in Pomona helped us to compare our results between that of a large city such as Brisbane to that in a small regional town. The majority of the users in Pomona seemed to have a positive consensus toward the town, they loved how it was and did not want it to change too much. The sense of community in a place like Pomona was quite strong where many people knew each other, people were friendly and proud of their town. However what was interesting about the Pomona case is that although the people tended to agree that the town was great how it was, they were still able to learn a lot through the InstaBooth about each other, themselves and the community.

The InstaBooth participants who were interviewed both in Brisbane and Pomona predominantly felt as though there are few opportunities to share their thoughts and ideas or voice their concerns in a public way. The citizens appeared to feel that whatever options do exist the people in authority are not actually listening to what the people have to say. Therefore users were largely supportive, interested and even excited about the InstaBooth as they tended to see it as their opportunity to voice their opinions, share their ideas, and discuss their concerns. By providing a voice to the people through the InstaBooth they felt as though

a communication channel was created which lead them to feel closer to each other and helped to establish a better understanding and sense of community. Overall it was a valuable experience and fostered a sense of place as people were able to engage with the InstaBooth and create new memories based on what they learned from others or how they felt about sharing their thoughts.

To support this argument it is valuable to discuss what aspects of the InstaBooth worked well in helping to attract the attention of participants. When asking the community representative from the Heart of Pomona committee, why he wanted to bring the InstaBooth to the town he said, *“Because it created a presence that would not have been created if there were two people sitting at a card table and handing out sheets of paper. It’s an interactive thing. I think people have been first of all captivated by the look and feel and shape and intrigue about what it is, and the second thing is that once they engage with it, their minds are extended,”* BPomona.

Another participant supports his thoughts, however refers to the emotional aspects, which the InstaBooth solicits. *“...It probably made you a little bit more thoughtful about what you were saying or writing, not just filling out a survey and circling a response. I guess it provoked a little bit more emotion than just doing a straight survey...Maybe the visual aspects and looking at the images but also looking at where other people had expressed an interest in the town, things that needed more love in those areas,”* KyliePomona. Kylie talks about the InstaBooth and the process of interacting with it and answering its questions in different ways as compared to a standard survey made her think more about her responses. When she was asked to explain what inspired the emotion she says it was the visual aspects of the InstaBooth such as the map seen in figure 68, where people could indicate the places that needed more love. This allowed her to visualise her town in a distinctive manner and think about what was placed where and why, what did these parts of the town mean to other people and by doing so it caused her to analyse the questions in more depth. This process inspired her to think deeper rather than merely filling in a circle.



Figure 68. Interactive tangible map in the InstaBooth while in Pomona, QLD

Through the interviews it was found that the InstaBooth reached people who don't usually engage with community consultations or normally seek avenues to share their thoughts. Sandy is an example of someone who openly admits she does not actively seek for ways to voice her opinions. *"Yes, I was able to have my say. I mean that's fantastic. I don't go up to these council meetings. I don't write letters to the newspaper but there are always times, and I'm sure there are always times for a lot of people, to want to express an opinion. We don't always...we tend to sit in coffee shops and express our opinions rather than being heard by the people who run the place," SandyPomona.*

The design of the InstaBooth purposefully integrated digital and tangible materials to act as a “Creative Catalyst” (Ogawa et al., 2012, p.58), to promote a collective creativity experience for participants through the processes of drawing, writing, and making while questioning the experience and definition of place. This approach is intended to attract the involvement of all people regardless of their access to technology or ability to read or write. From the interviews we can see that this aspect of the design facilitated a sense of creativity, thoughtfulness, and authenticity from a range of participants. Acknowledging different user types for community engagement informs the design process of such design interventions which not only includes different technologies, materials, structures but also the approach and expected outcomes.

In our project the main focus was to integrate different factors from media architecture and urban informatics, the areas of technology, people and place to create a situated community engagement tool that encouraged interaction from a broad spectrum of society. Understanding what the InstaBooth meant to participants and what motivated their use of it will inform future research in this area but also provides a better understanding of the impact that examining place through a creative approach can have on a community. What sets the InstaBooth project apart from the larger research projects mentioned earlier in this article or other community engagement tools is that the InstaBooth’s architectural design and structure creates a semi-private space within a public space and provides the materials (both digital and tangible) to allow for participants to create their own media content. By creating their own content the users become empowered to learn, play, or share their ideas to the level and extent they desire, therefore consuming the media as needed. This process of co-creation within this space causes moments of reflection, thought, and creativity to emerge and when the questions are political, social or civic in nature the users become creative citizens (Hargreaves & Hartley, 2016). The InstaBooth acted as a physical disruption in public space and it was by enabling the creative citizens to express themselves freely and openly the InstaBooth acted on the three dimensions of engagement; cognitive, affective, and behavioural. In doing so it allowed people to co-create place by exploring a sense of themselves, of others, and of the broader community ultimately helping people find consensus and celebrate difference. When this is possible and residents are able to feel empowered over their conditions research indicates that they have greater ability to create change and take action within their communities (Manzo & Perkins, 2006; Kemmis, 1990).

Conclusion

The concept of ‘situated knowledge’ defined by Donna Harraway, refers to the geographically and historically specific embodiment of a located subject (Hubbard & Kitchin, 2004). The understanding and perspectives of the world around them is different for each person therefore the variety of situated knowledge must be recognized and valued (Hubbard & Kitchin, 2004). From the accounts of the InstaBooth participants presented above we can conclude that one of the strengths of the InstaBooth is its ability to create and inform situated knowledge. This ability has allowed people to connect with one another and learn about their neighborhoods and communities in unstructured and creative ways.

The excerpts from the interviews provide evidence to assist in responding to the research question: *How does DIY/DIWO Media Architecture impact on place?* By providing a voice to people, the InstaBooth, a DIY/DIWO prototype of media architecture, is a valuable tool assisting citizens in communicating issues of concern and thoughts on the future of the place in which they live. The ability to share their ideas through different media instilled creativity and provided a space for thinking and learning. For some participants the process of interacting with the InstaBooth evoked emotions and facilitated connections between participants, the booth, and the location. Therefore we argue that the InstaBooth provided a valuable experience for its users shifting from a media architecture space to a memorable place. The InstaBooth created positive impact within the context of its deployments by assisting local citizens to establish a sense of community through a situated engagement tool that promoted creativity and expression. The main argument this article and the findings present is that the people in Brisbane and Pomona have felt as though they have minimal outlets for expression and are removed from decision making processes. By combining an architectural structure with different media and the theories of participation and urban informatics it is possible to provide new communication channels that enable creative citizens to explore notions of place and sense of community. Future research will continue to explore how such community engagement tools operate in different cultural and social contexts.

5.5 Summary

Design intervention #3, the InstaBooth, built on the findings from design interventions #1 & #2 further revealing that people can be inspired by and learn from their own creativity and the creativity of others. The InstaBooth tested the DIY/DIWO media architecture strategies indicating that a complete DIY media architecture is difficult to achieve within public spaces and with a diversity of people for community engagement. However there were levels of DIY aspects which were achievable such as the co-creation of the media content within the InstaBooth. The ability to create a do-it-with-others (DIWO) media architecture was possible through a co-design and co-creation process, by working closely with community partners and stakeholders, and ultimately allowing participants to control their level of participation and consumption of the media created and presented through the InstaBooth.

Acknowledging that people have different motivations or purposes for engaging with the InstaBooth assists to inform future design approaches. The findings from the interviews indicate that the InstaBooth promoted memorable experiences for participants by providing an opportunity for reflection and learning from others. This helped to foster better understanding of the community and the different perspectives and needs of the different people who make up the communities. In addition to this the findings revealed that many people feel disempowered and far removed from decision making processes. Participants felt a lack of opportunities for voicing their concerns or opinions about the city or town they live in South East Queensland and the current communication channels are not successful in capturing and conveying their thoughts. These findings point towards the opportunity for media architecture as a community of practice to respond and leverage the spatial and material qualities of architecture with the dynamic and interactive capabilities of media to assist people in communicating or expressing their desires in meaningful and effective ways.

The findings that people are not happy with current decision making processes is nothing novel. Societies have been grappling with this for decades. I do not propose the InstaBooth as a solution however it can be seen as an approach. It's a small step towards providing people another way of engaging with societal issues or wicked problems. In the next chapter, the conclusion situates the InstaBooth and other similar approaches into a broader discussion

about city making. An urban acupuncture framework is discussed to begin to reveal how these small scale interventions can begin to have greater impact by providing more opportunities for different people to make change and find sources of empowerment and agency over the places they live, work, and play in.

Chapter 6: Conclusion

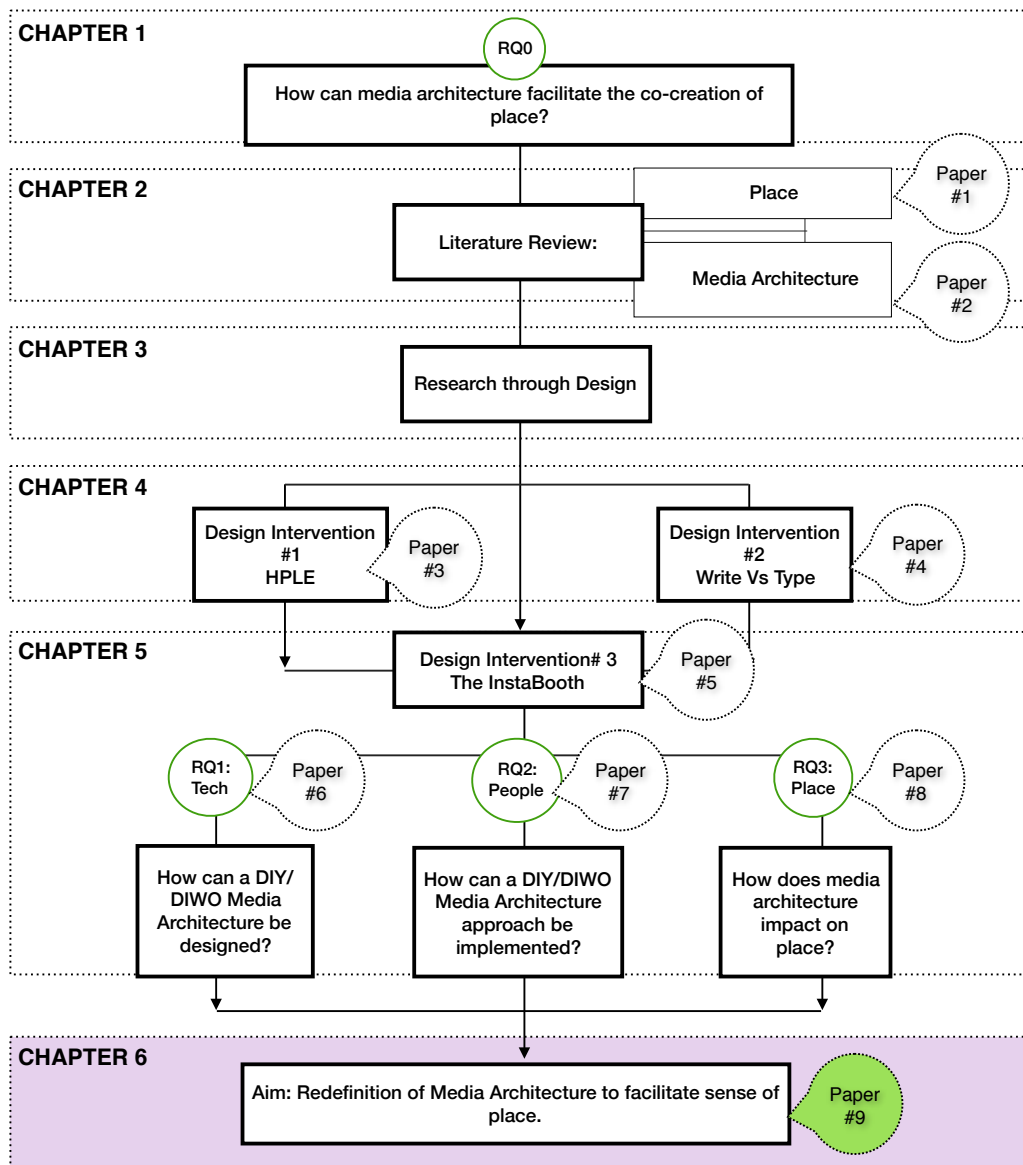


Figure 69. Way-finding Diagram of Chapters

Introduction

The conclusion chapter is divided into two parts. In the first part of the chapter a paper is presented which discusses the ability of different design interventions, including the InstaBooth, to create an urban acupuncture framework. Each design intervention acts as a disruptor in public space allowing for different people to explore different issues in tactical and location specific ways. When looking at the framework from a broader point of view we

argue that it is the aggregation of small urban interventions that can assist to make change in our cities that are continually evolving.

The second part of the conclusion chapter addresses the initial research questions, how they have been answered and how the aims of the PhD have been met. It discusses the significance of the research and the contribution to knowledge across three areas of; design and technology, media architecture and theory, and social and community. Based on the cumulative findings presented and discussed within the thesis, I propose my definition of media architecture as seen in Figure 69. Limitations and reflections on the PhD journey are discussed with a final section outlining future research work.

6.1 The City as Perpetual Beta: Fostering Systemic Urban Acupuncture

Statement of contribution of co-authors for thesis by published paper. The authors listed below have certified that:

1. they meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. they take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. there are no other authors of the publication according to the criteria;
4. potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit; and
5. they agree to the use of the publication in the student's thesis and its publication on the QUT ePrints database consistent with any limitations set by publisher requirements.

In the case of chapter 6.1:

Fredericks, Joel, Caldwell, Glenda, Foth, Marcus, Tomitsch, Martin (2016) The City as Perpetual Beta: Fostering Systemic Urban Acupuncture. In De Waal, Martijn & de Lange, Michiel (Eds.) *Hackable Cities: From Subversive City Making to Systemic Change*. Springer (TBC). (Accepted with minor changes for review).

CONTRIBUTOR	STATEMENT OF CONTRIBUTION
GLENDAL CALDWELL	Significant contribution to the planning of the paper, literature review, and assisted with the preparation and evaluation of the manuscript.
SIGNATURE	
DATE	18 July 2016
JOEL FREDERICKS	Significant contribution to the planning of the paper, literature review, and assisted with the preparation and evaluation of the manuscript.
MARCUS FOTH	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript.
MARTIN TOMITSCH	Contribution to the planning of the paper and assisted with the preparation and evaluation of the manuscript.

Principal Supervisor Confirmation:

I have sighted email or other correspondence for all Co-authors confirming their certifying authorship.

Mirko Guaralda

18/07/16

Statement of Contribution

Initially written for the Digital Cities 9 workshop at the Community and Technologies conference in 2015 this paper has evolved into a book chapter. I co-authored the paper with Joel Fredericks, Prof Marcus Foth and Associate Prof Martin Tomitsch who have provided guidance, input to revisions and edits. Joel and I have collaborated on all parts of the paper acknowledging that our PhD research interests are closely aligned. Joel has an urban planning background and has been similarly responding to community engagement challenges through hybrid (digital and tangible) approaches.

Preamble

This paper provides a broader view as to how a series of interventions such as the InstaBooth can make systemic change within the ever evolving landscape of contemporary cities. Within the paper pop-up community engagement interventions are defined. An urban acupuncture framework is proposed to inform a wider perspective on how small interventions can provide a middle-out strategy to city making.

Fredericks, Joel, Caldwell, Glenda, Foth, Marcus, Tomitsch, Martin (2016) *The City as Perpetual Beta: Fostering Systemic Urban Acupuncture*. In De Waal, Martijn & de Lange, Michiel (Eds.) *Hackable Cities: From Subversive City Making to Systemic Change*. Springer (TBC). (*Accepted with minor changes for review*).

Abstract

Applying the concept of perpetual beta to cities proposes that the process of city making is continual and never complete. This paper presents an *urban acupuncture* framework for undertaking localised small-scale community engagement activities through pop-up interventions. Pop-up interventions ‘hack’ public space by temporarily changing the feel of a place to promote awareness around civic issues. We argue that the use of pop-up interventions has the potential to provide more inclusive forms of community engagement by combining digital and physical media. The proposed framework employs pop-up activism to facilitate a bottom-up approach that encourages citizens to actively identify topics for discussion. Two pop-up interventions in different locations in Australia are discussed in the paper to assess in what way a systemic level of impact can arise from different processes of city hacking that are facilitated through a distributed, decentralised, yet concerted and regular local approach. We argue that a concerted process of implementing small urban interventions can contribute to an ongoing commitment to participatory city making. Further work will show how each local intervention can contribute to translating the notion of perpetual beta into systemic change beyond the boundaries of their individual locale and – taken together – across different urban environments of the city.

Introduction

Humanity faces many challenges in both the natural and the built environment. Cities struggle with increased pressure on urban infrastructures and housing caused by population growth, lack of public transport options, and more frequent natural disasters triggered by climate change. At the same time, citizens have more opportunities than ever to be involved in the planning, design and decision making process. Often seen as only a formality, local governments undertake community consultation processes to ask citizens about policy change and proposed infrastructure developments. This top-down approach generally *'informs'* citizens only rather than to *'engage'* people in the decision making process. As a result of this, grassroots movements, such as urban guerrilla (Hou, 2010) and DIY / DIWO (Caldwell & Foth, 2014, 2017) have encouraged bottom-up community engagement through localised urban interventions that empower citizens to identify topics and issues that need to be addressed within local communities. Drawing on the collective knowledge of all actors has a greater opportunity to enable a more inclusive and collaborative city making process. This can be achieved by employing a middle-out engagement process (Costa & Ferrão, 2010; Fredericks, Caldwell, & Tomitsch, 2016) that integrates the needs and interests from the decision makers at the top with those of the everyday people from the bottom, which are met somewhere in the middle. Acknowledging that the city is in a state of perpetual beta indicates that the processes of city making and urban renewal are never complete. These processes are cyclical occurring in different parts of the city at different times.

Community engagement activities range from paper-based interactions to those that are supplemented by digital applications providing new means and interfaces for the formation of 'urban publics' (de Waal, 2014). Such novel and complementary approaches to community engagement, aiming to address the shortcomings of traditional processes, are being investigated through the fields of digital placemaking (Fredericks, Hespanhol, & Tomitsch, 2016), urban interaction design (Brynskov et al., 2014), urban HCI (Fischer & Hornecker, 2012), urban informatics (Foth, Choi, & Satchell, 2011), urban computing (Kindberg, Chalmers, & Paulos, 2007), and ubiquitous computing (Weiser, 1993). These concepts are helping to improve the use of existing urban infrastructure and providing new opportunities

for connecting citizens with their city (Shepard & Simeti, 2013; Tomitsch, 2014). To focus on a particular approach that can create novel prospects, pop-up interventions ‘hack’ public space by appropriating new purposes and temporarily changing the nature and feel of a place. In doing so, they surprise people, stimulate their imagination, and create public awareness in citizens (Fredericks, Tomitsch, Hespanhol, & McArthur, 2015).

In this chapter, we discuss how pop-ups can offer both built environment professionals and local citizens an alternative option for community engagement to ultimately inform and improve the city making processes to: (a) raise awareness of the engagement process; (b) encourage community discussion around urban planning, design and architecture topics; (c) involve greater cross-sections of the community (e.g., time poor citizens, younger demographics, and multicultural groups), and; (d) allow citizens to submit their responses on the spot. To facilitate a more inclusive and middle-out engagement approach, this chapter presents an urban acupuncture (Lerner, 2014) framework for undertaking localised small-scale community engagement activities through pop-up interventions. We discuss two case studies that deployed pop-up interventions in Australia, as different tactics that attempt to give the community a say in the transformation of their city. Based on our research findings the framework is intended to encourage citizens to actively identify topics that they would like to see community discussion around. In our approach, we foster systemic change in city making by accumulating many voices, actors, devices, and technologies.

First, we discuss the concept of perpetual beta and how it applies to the city. We position the perpetual beta concept as a platform that supports the need for pop-up interventions as key instigators of change. Second, we discuss the urban acupuncture framework as a guide to inform the development of pop-up urban interventions, such as the two Australian examples discussed. We conclude with a series of questions that explore the potential of cities to move from a state of perpetual beta through a series of accounts and sites to the possibility of producing systemic change.

The City as Perpetual Beta

The twenty-first century city is in a state of perpetual beta as governments around the world continuously realign strategies to address a myriad of political, social, economic and

environmental challenges that engender contemporary society. Originally used in the context of software development, the open source advocate O'Reilly (2015) states, "*The open source dictum, 'release early and release often,' in fact has morphed into an even more radical position, 'the perpetual beta,' in which the product is developed in the open, with new features slipstreamed in on a monthly, weekly, or even daily basis.*" O'Reilly (2015) argues that the perpetual beta concept harnesses collective intelligence by acknowledging users as co-developers.

The concept of perpetual beta has also been applied to other areas outside of software development, such as in business, knowledge management (Levy, 2009), and entrepreneurship. In 2010, Pierce (2010) ran a Kickstarter campaign to raise funds in support of the documentary film *Life in Perpetual Beta* about the influence that technology has on how we consider business and our lives. Perpetual beta in these instances commonly refers to the process of continual improvement, where a finished product would never be good enough. The foundations of the perpetual beta concept connected to technological developments and an open source approach led us to apply the 'unfinished concept' to that of city making.

Sassen (2016) refers to this notion of the city as perpetual beta when describing "*...an understanding of the city as a combination of incompleteness and complexity: it is this mix that has enabled cities to outlive enterprises, kingdoms, nation-states, and, yes, Cisco Systems*" (Sassen, 2016, p. 1). The city, as a concept, is one that is continuously changing, evolving – it shrinks and grows, ebbs and flows, with multiple layers of complexity in both physical forms (buildings, roads, people, trees, etc.) and digital forms (electricity, telecommunications, internet, etc.). We recognise that the management and administration of a city can be smart, for example by using technology for controlling traffic patterns, lighting up, sensing weather, managing waste, etc. People can be smart, too, in that they use mobile technology to plan meetings, communicate with anyone, anywhere, record videos, access and create information, seamlessly and simultaneously (Hemment & Townsend, 2013). How do these smart citizens who live in smart cities tap into the digital layers of the city's communication flows to inform the creation of the environments in which they live, work and play? If these cities are so smart how do they use this acquired intelligence of the many to

keep getting better and tackling the big social and environmental challenges facing our society and our planet (Foth & Brynskov, 2016a)?

Local governments are no longer seen as the sole caretakers of cities that have to respond to the needs of their inhabitants. Conventional community engagement processes are still central to the renewal cycle of city improvement, however, it is a difficult task challenged by citizens who are hard to reach and communicate with using archaic engagement mechanisms. We refer to Foth and Brynskov (2016b) who examine civic media and technologies to indicate that, *“in order to provide meaningful civic engagement, the city must provide appropriate interfaces.”* We are interested in exploring what Brynskov et al. (2014) describe as a shift from city management to city making through urban interaction design. Urban interaction design is the making of urban interfaces to provide a means of citizen engagement (Foth & Brynskov, 2016a). These views on the co-creation of cities are in line with the work of de Waal (2014) who examines the city as an interface, and we can conclude that both sets of arguments are applicable and compatible with each other. Synthesising these thoughts, Foth and Brynskov introduce four stages in the evolution of the relationship between local governments and city residents (Table 9) (Foth & Brynskov, 2017, forthcoming). The city operates on multiple scales and can be approached from many angles, but in this chapter, we are particularly concerned with the ways in which people leverage technologies for their own purposes to pioneer new community engagement tactics and ultimately bring about a participatory and collaborative approach to city making.

Table 9: Evolving Relationship between Cities and Citizens (Foth & Brynskov, 2017, forthcoming)

	City Government	People
City 4.0	Collaborator	Co-Creators
City 3.0	Facilitator	Participants
City 2.0	Service Provider	Consumers
City 1.0	Administrator	Residents

Urban Acupuncture

Helping us zoom from the bird's eye view of the city administrator to the pedestrian, that is, local view of the smart citizen, is the notion of urban acupuncture. This concept was originally conceived by the Barcelonan architect and urbanist, Manuel de Sola Morales. The concept aims to use localised small-scale socio-technical interventions to transform the larger urban context (Houghton, Foth, & Miller, 2015; Tomitsch, McArthur, Haeusler, & Foth, 2015). Locations are selected through a comprehensive analysis of social, economic and ecological factors that involves dialogue between designers and communities. Urban acupuncture embraces the city as a living organism (Iaconesi & Persico, 2014; Lerner, 2014), and identifies areas within cities that require urban renewal. Lerner (2014) describes the essence of urban acupuncture as “...sometimes, a simple, focused intervention can create new energy, demonstrating the possibilities of a space in a way that motivates others to engage with their community. It can even contribute to the planning process. This gets to the essence of true urban acupuncture-it needs to be precise and quick, that's the secret” (Lerner, 2014, p. 4). Our research and case studies presented in this chapter are based on this notion of urban acupuncture, each a temporary intervention in an urban space purposefully deployed precisely and quickly to provide people an opportunity to share their ideas or voice their concerns. Building on these principals of urban acupuncture we focus on how these short-term or “pop-up” interventions facilitate participation, collaboration, and knowledge sharing to ultimately inspire forms or degrees of change. The urban acupuncture framework we propose draws on literature from three key areas: (1) existing community engagement within the built environment; (2) digital technologies and their influence on the approach to community engagement, and; (3) from top-down to bottom-up to middle-out engagement concepts.

Existing Community Engagement within the Built Environment

Community engagement is undertaken by Local Government Authorities (LGAs) around the world to obtain public feedback on the development of infrastructure within the built environment. Through collaboration with communities, businesses and government organisations (Foth & Adkins, 2006), community engagement should guide urban planning decisions based on the outcomes of the engagement undertaken (Fredericks et al., 2015). LGAs, as the level of government closest to the people, undertake community engagement, generally as a legislative requirement, to inform communities on the creation of policies and

infrastructure developments within the built environment. However, relationships between local communities and LGAs have traditionally played a consultative role, with the level of engagement reduced to informing communities only. As a consequence, the engagement process and the level of community input is controlled by LGAs, and is often attributed to political agendas of elected representatives, political party practices and bureaucratic power-brokers (Cuthill, 2003).

Current methods of community engagement, such as, face-to-face workshops, community forums, public hearings, and online forms, only reach certain demographics of the population. As a result of this, opinions of community members classified as 'hard to reach' are not reflected in the overall engagement process. Innes and Booher (2004) argue that legally required methods of community engagement in government decision making rarely achieve genuine engagement outcomes; create dissatisfaction amongst citizens who feel they are not being heard; do not significantly improve the decisions of government agencies; and do not incorporate a broad spectrum of the community. It has been further argued that some traditional engagement practises suffer from a lack of integration between governments and the public, and has been shown to have inadequate representation of age groups and demographics (Fredericks et al., 2015; Hosio, Goncalves, Kostakos, & Riekki, 2014; Schroeter, 2012). Sarkissian et al. (2009) developed the following eight points that identify the underpinnings of successful collaborative community engagement rather than top-down approaches employed by government agencies:

1. People know more than they realise;
2. People cannot participate satisfactorily unless they can understand the language being used;
3. People often fear giving opinions, especially in their local community;
4. People's involvement improves the quality of local government;
5. Synergy is more likely to occur when people collaborate;
6. Specific skills are required;

7. Relevant professionals should be involved from the start, and;
8. There is community value in sharing participatory experiences.

The eight points place the focus on people not on the policy. The essence of a middle-out approach arises from the needs and will of people to take action for themselves. It is in this spirit that the interventions we discuss in this chapter are directed towards providing a voice for more people.

Digital Technologies and Community Engagement

Within the last decade, information and communication technology (ICT) has evolved from the workplace and integrated into all aspects of daily life (Tomitsch, 2014). Moreover, human-computer interaction (HCI) technologies are increasingly being designed for urban environments, such as smart phones and web 2.0 applications. Tomitsch (2014) explains how the ICT industry is in the early stages of exploring the variety of possibilities that new digital technologies offer to make more efficient use of existing infrastructure within the built environment.

Gordon and Manosevitch (2010) introduce the concept of augmented deliberation as a design solution to address challenges where community engagement is complicated by external factors. Augmented deliberation is intended to address a range of social challenges, including language barriers, demographic variations and professional discourse. The intention is to enhance community engagement by incorporating appropriate technologies, for example, combining traditional planning practice and public deliberation into a digital environment (Gordon & Manosevitch, 2010).

Fredericks and Foth (2013) investigated how social media and web 2.0 applications could be incorporated as additional tools and techniques for community engagement in urban planning. They examined this approach as a way of supplementing traditional methods of community engagement that had a general preference for participants attending an organised consultation event. Additionally, the research explored how community engagement can include a broader cross-section of society through the adoption of digital tools. The study concluded that traditional and digital methods of community engagement could be used as a hybrid approach. Furthermore, the research identified that the integration of digital tools

presented opportunities to capture a wider audience, attract younger participants, and provide communities with the ability to be actively involved in the urban planning process (Fredericks & Foth, 2013).

Schroeter and Foth (2009) created *Discussions In Space* (DIS) as a design experiment to facilitate a locally situated discussion and opinion forum around urban planning topics, issues and questions, which were displayed on a large public screen. Members of the community were able to submit questions directly to the screen using their mobile phone's SMS, Twitter or web capabilities. The messages displayed on the screen in real-time provide citizens an additional platform for collective expression and public discourse. Schroeter and Houghton (2011) discuss how community engagement is usually resource and time intensive, and how this challenge can be addressed by capturing the attention of digitally savvy community members. They call on LGAs to go with the times by adopting some of the digital channels already well established by corporate entities for the purpose of sales and marketing.

Hespanhol et al. (2015) undertook a research study that deployed two situated *Vote As You Go* polling interfaces on a public urban screen for community engagement. Engagement questions were posted on the urban screen to obtain community feedback via a polling system (Figure 70).



Figure 70. Screenshot of the urban screen during the study

The first scenario used a tablet device mounted on a stand that participants could interact with, by simply answering yes or no on the application. The second scenario incorporated a

playful full body interaction application where an outline of participants playing with the interface would be visible on the screen. They could then indicate yes or no by using gestures such as moving their hands. The different scenarios allowed the researchers to compare data on participant experiences and the effectiveness of the interface's visibility within an urban space. The study concluded that using these types of interfaces in urban spaces could be an effective strategy for attracting the attention of the general public and converting them into active participants (Hespanhol et al., 2015).

The *Smart Citizen Sentiment Dashboard* (Behrens, Valkanova, gen. Schieck, & Brumby, 2014) took the form of a media architecture interface, which connected users in public spaces to media façades. Participants were able to activate the media façade of a building by using RFID cards to respond to civic issues pertaining to topics such as safety, transport, housing and public spaces (Behrens et al., 2014). Responses were aggregated and displayed through mood-indicating colours and animations on the screen to represent the overall sentiment of city dwellers. This project is a valuable example of how existing infrastructure, such as, a media façade can be 'hacked' as a type of DIY or DIWO (do it with others) platform (Caldwell & Foth, 2014, 2017, forthcoming). Without dedicated interaction mechanisms (here the RFID interface), city dwellers have no way of interacting with or informing the content displayed on large-scale urban interfaces, such as media façades or urban screens.

Each of these cases exemplifies alternative approaches to community engagement, which rely on different forms of technology to expand the reach and extent of participation from users. Similarly, our projects discussed in this chapter continue to develop a broader understanding for the ways in which different media types (digital, analogue, and social) can be implemented within the design and deployment of urban interventions. We expand on this research by examining how the different stakeholders' needs and interests are met and responded to, and what impact for them and the city at large they may have. The purpose of each example is to increase the levels and depths of community engagement by creatively hacking into public space.

City Hacking: From Top-Down to Bottom-Up to Middle-Out Engagement

Since the early twentieth century cities around the world have established and implemented a variety of urban development paradigms that have shaped the urban fabric within local communities. Government decision makers have taken a centralised top-down approach in the design and implementation of city making. For example, Ebenezer Howard conceived the ‘Garden Cities of Tomorrow’ as a solution to decentralise from congested and unhealthy cities into groupings of 30,000 people along an agricultural greenbelt (Richert, 1998). Le Corbusier (1967) created the *Radiant City*, which has influenced the design of large building blocks through ‘brutalism architecture’ (Shonfield, 2000). This was a top-down and highly controversial solution to address public housing needs across cities in Europe, the America’s and Australia. Present day paradigms such as transit-oriented developments aim to foster economic and residential development around public transport routes and master-planned communities that incorporate civic services, residential housing and public amenities. Although these top-down initiatives have varying degrees of success in creating urban environments many citizens across the world continue to feel disempowered or unheard when it comes to urban development. Traditional approaches still employed by LGAs are outdated, have the ability to fragment communities and excludes certain demographics of society (Fredericks et al., 2015; Sarkissian et al., 2009; Schroeter, 2012).

As a result, many people are taking matters into their own hands with growing evidence of bottom-up approaches to city making. Community members have taken it upon themselves to test the needs, wants and aspirations of civic spaces in modern society. This contemporary approach has led to bottom-up localised urban interventions in the form of pop-ups – referred to as pop-up urbanism (Fredericks et al., 2015), tactical urbanism (Lydon et al., 2014), guerrilla urbanism (Caldwell, Osborne, Mewburn, & Crowther, 2015; Hou, 2010), DIY / DIWO urbanism (Caldwell & Foth, 2014; Douglas, 2014; Iveson, 2013), and urban acupuncture (Houghton, Choi, & Lugmayr, 2015; Iaconesi & Persico, 2014; Lerner, 2014; Tomitsch et al., 2015). Pop-up interventions ‘hack’ public space by appropriating new purposes and temporarily changing the nature and feel of a place. These approaches can be used as temporary installations that are either set up for a few hours or for an extended period of time. The Better Block project (‘Better Block’, 2016), which is being implemented in many cities throughout the United States, is an example of rapid urban revitalisation, or otherwise known as guerrilla urbanism (Caldwell et al., 2015; Hou, 2010). Being a

community-driven initiative, the Better Block project aims to revive underutilised city blocks by retrofitting these spaces to promote pedestrian and cyclist activity through temporary interventions, such as pop-up shops, positioning of trees and painting bike lanes onto the road. The project thus utilises existing community resources to create multi-modal transportation that takes the focus away from private vehicle dominated roads. These temporary interventions enable communities to experience the potential of underutilised spaces and how they can be repurposed as usable civic space. PARK(ing) Day, which started in 2005, is an example of grassroots pop-up or DIY urbanism, where citizens reclaim metered car parking spaces and convert the area into a mini-park. The concept was coined by 'Rebar', an art and design studio in San Francisco that first converted a metered parking space into a temporary public park in 2005 ('<http://parkingday.org>', 2016). This concept has evolved into a global movement, involving individuals and organisations, which encourage collaboration amongst the community to create temporary additions to the public space.

Attempts to employ more collaborative engagement approaches have seen partnerships established between LGAs and local communities to create a middle-out approach for community engagement. The concept of middle-out was coined by Kinchla and Wolfe (1979) as a collaborative process that draws on the knowledge from higher (top-down) and lower (bottom-up) information channels that come together and meet in the middle. An example of this is the *PopUp MANGO* ('Pop-up MANGO', 2015) temporary street festival where local citizens could interact with proposed urban design and roadway changes through a collaborative design process. The pop-up intervention included temporary traffic calming devices, a parklet with plants and seating, live entertainment, food trucks and activities for children. The event was organised as a partnership between the LGA, an urban planning and design consultancy, and local community groups. This approach provided all stakeholders with an opportunity to evaluate the proposal within the space and be involved in the planning process through a practical hands-on approach. As a result of this community engagement event a concept plan was created based on the feedback of all stakeholders. Pop-up town halls are another example of informal and collaborative community engagement that provides opportunities to involve a variety of top-down and bottom-up stakeholders. These types of pop-up interventions are located in public space that is easily accessible to community members in comparison to traditional events held within specific timeframes and locations

(e.g. charrettes, town hall events, public workshops). They can utilise unused civic spaces and empty shop fronts, however, for maximum impact they should be located in an area of high pedestrian activity, and be held in parallel with other public events, such as festivals, exhibitions and conferences.

Pop-up interventions have the potential to hack into the collective knowledge of all stakeholders within local communities. This provides opportunities to encourage a more rich and open civic discussion, enable collaboration between a variety of top-down and bottom-up stakeholders, and inspire the exchange of ideas (Fredericks, Caldwell, et al., 2016; Lydon et al., 2014). We will further expand on these examples through our case studies below by demonstrating a middle-out (Costa & Ferrão, 2010; Fredericks, Caldwell, et al., 2016; Janda & Parag, 2013) engagement approach that aims to integrate the needs and interests from LGAs (top-down) with those of the everyday people (bottom-up).

Urban Acupuncture Framework

Linking our research to HCI, media architecture, and urban planning, we discuss two pop-up interventions in this chapter that were concerned with community engagement in two different urban locations in Australia. Reflecting on the design process leading to the interventions and the result from their deployment evaluation, we have developed an urban acupuncture framework (Figure 2), which assists us in highlighting the decision making process for implementing pop-up interventions *in-the-wild*. The concept of conducting research *in-the-wild* refers to the testing of prototypes in public space to see how they are adapted and used in everyday life (Chamberlain, Rodden, Jones, & Rogers, 2012). Evaluation *in-the-wild* can include the recording and observation of how people interact with, adapt, and use the prototype providing a different approach than testing in controlled lab environments (Chamberlain et al., 2012). Many researchers in the HCI field have incorporated *in-the-wild* approaches to their research and design development, whereas in urban studies, research is constantly tested in the built environment and has always been *in-the-wild*. Recent research pertaining to media architecture and urban interfaces has also relied on *in-the-wild* research (Fatah gen Schieck et al., 2014; Hoggenmüller & Wiethoff, 2014).

Our Urban Acupuncture Framework applies a participatory action research methodology (Foth & Brynskov, 2016b; Hearn, Foth, & Lennie, 2009) with the intention to include local

stakeholders in the different planning stages of the interventions. Due to their agile nature the pop-ups can respond in each step or iteration to the needs of the context and people involved in the deployments.

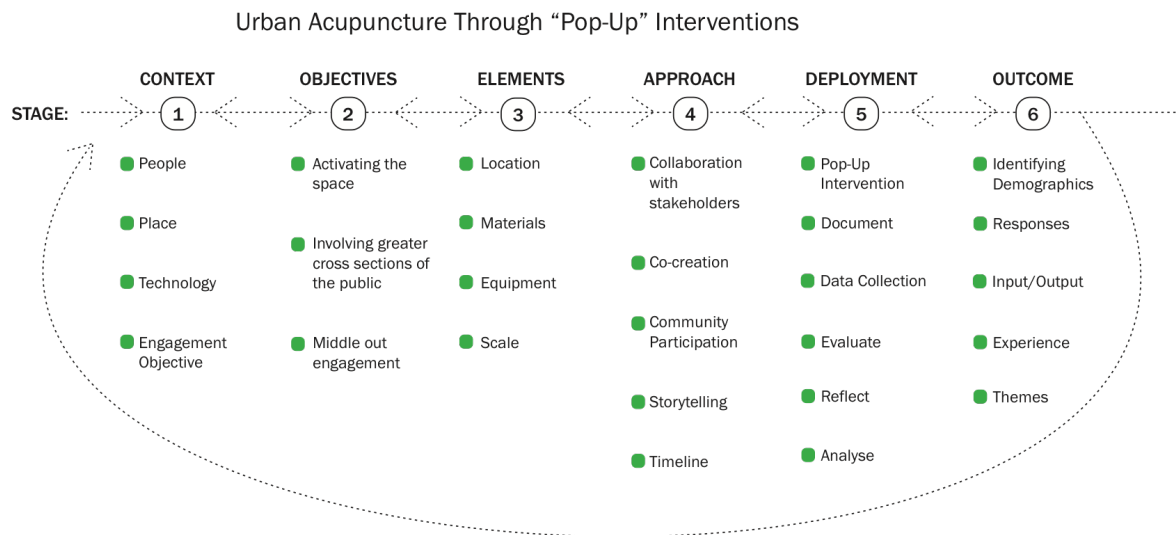


Figure 71. Urban acupuncture framework using pop-up interventions

The framework consists of six stages: context, objectives, elements, approach, deployment and outcome. Each stage is made up of different concepts that require consideration when creating and deploying a pop-up intervention.

- 1. Context** – The first stage is to examine and understand the local context including the people who create the places within it. The use and type of technology that will be utilised and the needs to be considered in line with the engagement objectives;
- 2. Objectives** – The second stage focuses on the objectives of the intervention including how to activate the public space by involving a greater cross section of the public through a variety of tools or approaches within the pop-up. Informing local communities about the engagement activity to promote collaboration and interaction with the intervention. Stage one and two often inform each other and do not necessarily occur in a linear manner, they can be developed in parallel;

3. **Elements** – The third stage takes into consideration certain design elements of the pop-up, such as the location, timing and duration, in addition to the materials and equipment required to construct it. The size and scale of the pop-up are also important factors to consider when addressing the context of the site;
4. **Approach** – The fourth stage addresses the approach undertaken for implementing the pop-up intervention, including collaboration with top-down (LGAs, private enterprise) and bottom-up (local citizens, community groups) stakeholders to co-create the engagement process;
5. **Deployment** – The fifth stage considers the actual deployment of pop-up interventions in public spaces. This includes the mechanisms to document and collected data, and how it can be evaluated and analysed.
6. **Outcome** – The sixth and final stage identifies the results of installing the pop-up intervention, including the identification of engagement themes and a deeper understanding of local demographics needs, wants and aspirations. The responses collected through the intervention in both their input and output formats can be analysed to discover recurring themes arising from the contributions of the participants.

The following case studies demonstrate how this framework can be implemented using pop-up interventions in two different Australian cities: Sydney and Brisbane. Both studies formed part of two existing community engagement programs with official stakeholders deciding the engagement objectives prior to the pop-up deployment. However, we employed a transdisciplinary approach in the design and development of the engagement activities, which included informal meetings with local stakeholders and co-design workshops.

Study I: Digital Pop-Up

Context

Digital Pop-Up was implemented in collaboration with an LGA in Sydney, Australia. It is a result of a multidisciplinary research team from the Design Lab, The University of Sydney, involving an urban planner, interaction designer, visual designer, and creative technologist. The findings of this study were published by Fredericks et al. (2015). We deployed three variations of our pop-up intervention over three separate days within a busy public square consisting of: (1) a standalone tablet device on a stand with a customised voting web interface juxtaposed with an existing urban screen, during a regular workday; (2) an unstaffed pop-up during a cultural festival using a tablet device, an adapted web interface that allowed text responses, the urban screen, market umbrella, synthetic turf and barstools, and; (3) a staffed pop-up during a regular workday utilising the same tablet device with web interface, the urban screen, gazebo structure, synthetic grass, ottoman seating, plants, and 'call to action' signage, which was displayed on the urban screen and on physical posters at the pop-up.

Objectives

The objective of this study was to obtain community feedback on how to promote healthy lifestyles and improve recreational needs within the community. Specifically, our intention was to engage with a variety of demographics, including local office workers, business owners and people who are culturally and linguistically diverse. In addition to that we wanted to deploy a pop-up intervention that included the engagement objectives of the LGA, but was able to openly capture the needs, wants and aspirations of local citizens without any interference from other actors.

Elements

The civic space in which this study was conducted is used by local residents, office workers, and as a pedestrian thoroughfare. The location is surrounded by an entertainment quarter, restaurants, a public library, and is within close proximity to a large shopping precinct and public transport interchange. The civic space also features an existing urban screen used for delivering a variety of entertainment content, and a grassed open space used as a meeting point and for social gatherings. The first iteration of this study was deployed for a total of two hours and incorporated a standalone tablet device on a stand that was used in conjunction

with the existing urban screen. The tablet device was situated diametrically opposite the urban screen, which was located on the intersection of two walkways exposed to continuous pedestrian movement. The second iteration was deployed for a total of two hours within the same civic space, incorporating the tablet device on a stand, and market umbrella and seating. The third iteration was also deployed for a total of two hours, however, a gazebo structure was used and call-to-action signage was introduced on the urban screen and surrounding the pop-up to draw attention to the engagement activities.

Approaches

We held informal meetings with representative from the LGA (top-down decision maker) to discuss the engagement objectives, including the contextual information, engagement questions and types of demographics they wanted to capture. In addition to this, we employed a transdisciplinary research team for the design and development of our pop-up interventions. Over a three-month period, we evaluated and tested our designs, which we continuously refined based on observations and participant feedback during the deployments. For the purpose of this study the bottom-up component incorporated the community interactions during the three deployments and the feedback received from participants regarding the pop-up set up and functionality.

Deployment

Our overall goals for this study were (1) to draw attention to the engagement activity; (2) to create discussion around healthy built environment, and; (3) to provide a space for participants to interact within the civic space. Each of the studies utilised the existing urban screen, which was used as the output channel to display the community engagement questions and participant responses in conjunction with a tablet device with a customised web interface that served as the input channel for participant responses.



Figure 72. Study 1 pop-up design



Figure 73. Study 2 pop-up design

Outcome

Data collected from the three iterations produced valid responses in regards to LGA services and healthy lifestyles with a total of 27 responses received. In addition to this we undertook 13 semi-structured interviews with willing participants. All participants expressed positive feedback regarding *Digital Pop-Up*, reflecting that this approach to community engagement works well in contemporary society and is not something that is not normally located in a civic space. Representatives from the LGA highlighted that *Digital Pop-Up* is an effective approach to complement existing community engagement approaches and has a greater potential to attract a younger demographic. Our case study showed how this approach deployed within a civic space provides citizens the option to participate on the spot, with little effort in comparison to attending an organised engagement event during a specific

timeframe. Our study further demonstrated how existing digital technologies, such as, tablets and urban screens can be easily appropriated to engage citizens in a pop-up environment within a civic space.

Study II: InstaBooth

Context

The *InstaBooth* is a telephone booth inspired portable flat-packed structure that has been designed and fabricated to enable an alternative approach to community engagement (Johnstone, Caldwell, & Rittenbruch, 2015). The *InstaBooth* incorporates a combination of interactive modules with different types of physical and digital media to ask questions of its users and gather feedback. It is the result of a multi-disciplinary research project lead by researchers from the Urban Informatics Research Lab, Queensland University of Technology that consists of team members from the disciplines of architecture, urban planning, interior design, interaction and visual design, and urban informatics. In collaboration with the U.R.{BNE} Collective (urbne.com), an independent group of urban planners, architects, designers, and artists, the *InstaBooth* was deployed in April 2015 during the U.R.{BNE} Festival. The festival is an annual event held within the Brisbane central business district with the purpose of bringing together a range of artistic, design, and social interventions to inspire people to question the future city of Brisbane.

Objectives

The nature of the deployment and the types of questions asked through the *InstaBooth* during the U.R.{BNE} Festival was discussed and elaborated based on collaboration with the festival organising committee and the *InstaBooth* team. The questions and interaction modules were designed to gather insight from the community on their needs for better infrastructure to promote healthy and active lifestyles including better food options.



Figure 74. InstaBooth design



Figure 75. InstaBooth activities

Elements

During the U.R{BNE} Festival the *InstaBooth* was installed in two distinct locations in the Brisbane central business district over the course of five days. In the first location the *InstaBooth* was set up for a Friday evening at the location of the main event of the festival, a park in inner-city Brisbane. The second location was on the edge of the Queensland University of Technology (QUT) campus and next to a busy pedestrian and cycle bridge linking the Brisbane central business district with the cultural precinct across the river. During this deployment at the two locations the compilation of interaction modules and the

questions asked through them remained the same. The *InstaBooth* had a range of interactive modules including paper based questions, iPads with photo sharing and voting options, an overhead projector, and Discussions in Space (Schroeter and Foth, (2009) a screen based consultation tool that promotes a question and responses are collected through twitter or SMS message. The data collected was concerned with three aspects of the *InstaBooth* project; (1) the experience of the user with the *InstaBooth*; (2) the comments and drawings created by the users in response to set questions, and; (3) observations.

Approaches

The composition of the interaction modules included a range of paper and tangible media to allow for a greater range of participation and interaction to occur regardless of a user's ability to use specific technology or ability to write. The bespoke design of the InstaBooth including the open and anonymous nature of the interaction modules stimulated playful yet authentic forms of dialogue to occur within the commentary and drawings collected through the InstaBooth during U.R.{BNE}. The level of engagement within the InstaBooth was controlled by the participants which helped to foster a sense of empowerment. This process allowed for users to co-create the media content within the InstaBooth (Caldwell & Foth, 2017).

Deployment

To evaluate the experience that users had with the InstaBooth, 27 participant interviews were conducted. The responses collected from the people through the interaction modules increased over the days of deployment perhaps indicating a level of growing comfort or increased curiosity of the InstaBooth. The overall sentiment was generally positive, in total 138 notes and drawings were collected through the paper-based interactions, and 6 text and twitter messages were recorded through the digital module.

Outcome

A thematic analysis (Braun & Clarke, 2006) was conducted on the comments (paper and digital) and drawings that were captured through the InstaBooth. The findings indicated that participants tended to seek more playful physical infrastructure, greater variety of healthy food options, and diversity of cultural and social events to promote better health within the city of Brisbane. During its deployment at the festival and through the different interaction modules and media types the InstaBooth created a temporary place for voicing concerns, sharing ideas, and learning from others that was open and accessible to anyone. The observations and experience from this initial deployment of the InstaBooth informed design changes to some of the interactive modules, mainly to improve their ease of use for future deployments of the InstaBooth. Following the U.R. {BNE} Festival the InstaBooth has been involved in over 10 community and public events throughout Brisbane and Southeast Queensland since 2015. The InstaBooth has shown how an urban intervention such as a ‘pop-up’ structure can ‘hack’ into parts of the city to transform them from public spaces to places that generate discussion, learning, and different forms or levels of community engagement to occur.

Implementing Systemic Change

“Everyone knows that planning is a process. Yet no matter how good it may be, a plan by itself cannot bring about immediate transformation. Almost always, it is a spark that sets off a current that begins to spread. This is what I call good acupuncture – true urban acupuncture,” (Lerner, 2014, p. 3).

In this book chapter we have proposed an urban acupuncture framework to assist in creating urban interventions that are based on the community engagement objectives, location of the activity and duration for pop-up interventions. To exemplify how the framework can be implemented we presented two middle out (Costa & Ferrão, 2010; Fredericks, Caldwell, et al., 2016) city hacking activities through pop-up interventions that were undertaken at two different locations in Australia. We argue that city hacking through pop-up interventions can contribute to systemic change in both local communities and across entire metropolitan areas, fostered by the accumulation of many voices, actors, devices and technologies. Figure 76 conceptualises a series of pop-up interventions that individually address the locations in

which they are situated, however, it is the evolution and series of pop-ups building on each other that will assist in creating systemic change.

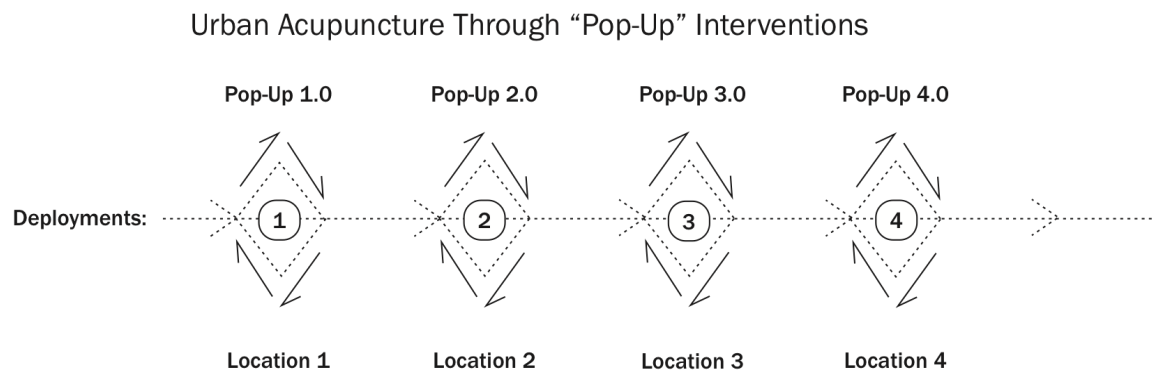


Figure 76. Pop-Up deployments in different locations to foster systemic change

An example of systemic change created through city hacking is PARK(ing) Day (<http://parkingday.org>, 2016). This DIY urbanism concept or ‘hacktivism’ has evolved from an unauthorised reclaim of public space into ‘parklets’. The parklet concept is an example of systemic change through the support gained by elected representatives, government agencies and communities throughout the United States, Europe and Australia, and has become an acceptable reclaim of public space beyond a ‘one day a year’ intervention (Mustafa, Watson, & Colman, 2014). We point out similarities to the concept of ‘perpetual beta’, in the context of the built environment, where a city is continually changing, evolving, and growing. The pop-up approach is particularly promising for addressing increased pressures on infrastructure within the built environment, such as population growth, housing densities and public transport. Perhaps our cities don’t need more infrastructure, instead we should use what we already have in a better way? Similarly, the notion of ‘infrastructure’ could extend to the entire city (Ratti, 2015) and also consider the city’s ‘infostructure’ (Tomitsch & Haeusler, 2015) as a way of making better use of existing resources.

Although parallels can be drawn between urban acupuncture through localised small-scale interventions, such as, the *Digital Pop-up* and *InstaBooth* case studies discussed in this chapter, results informing city making however depend on the community engagement methods used. For example, employing a participatory action research methodology (Foth &

Brynskov, 2016b; Hearn et al., 2009) by involving LGAs, community groups, organisations and relevant stakeholders from the outset of the engagement activity are promoted in order to create a middle-out approach. It should be highlighted that LGAs undertake engagement with the intention of obtaining community feedback as a legislative requirement (Innes & Booher, 2004), however, the decision-making process and power still lies with the LGA and not the community. Traditionally, urban acupuncture has been used to create a dialogue between designers and communities around architecture projects located in areas that had been identified as needing repair. We propose to extend this definition to include city hacking through pop-up interventions for community engagement, to obtain public feedback on infrastructure within the built environment. Through this attitude we encourage LGAs to explore the idea of opening their cities to hacking in order to create an open source city. This can be achieved by lowering regulations and restrictions for the deployment of pop-up interventions, hosting hack-a-thons, providing hackable spaces and sharing data and resources to encourage citizens to question and provide solutions to city making. Additionally, this approach can be used for both locally based (e.g. urban renewal in a local community) and citywide projects (e.g. improvements to city pedestrian and cycle paths).

We have shown that implementing the urban acupuncture framework has encouraged a middle-out approach to community engagement by drawing on the collective knowledge of top-down and bottom-up stakeholders. This concept further explores how the final outcomes of each local intervention can contribute to systemic change past the individual locale and – taken together – across different urban environments. We propose the urban acupuncture framework as a dynamic, continuously evolving tool, to be adopted, further expanded and developed by practitioners of community engagement, urban planners, designers, architects and community members who contribute to the engagement process.

6.2 Research Aims and Contribution to Knowledge

The previous chapters and sections include 9 papers that have been published or are under review. The first two papers present the literature review which introduces the key theories regarding place, hybrid place, media architecture and DIY/DIWO media architecture. Building on the theoretical framework the following papers expanded the literature review as they supported the exploration of the three design interventions (DI #1-3). Design interventions #1 and #2 were early studies that assisted in exploring and developing different approaches and methods to conduct research within different contexts. Design intervention #1 revealed that drawings can be used as effective ways for people to explore their perception of places that are important to them. Design intervention #2 focused on exploring situated community engagement through the comparison of a digital interface with an analogue version. The findings demonstrate that both digital and analogue media have merits when conducting community engagement and a hybrid approach would be most effective in attracting the engagement of a greater diversity of the population. The ability to collect and analyse data in the early stages of the research provided valuable insights that informed the design and execution of design intervention #3, the InstaBooth. Chapter 5 defines and discusses three facets of the InstaBooth, its design, implementation, and impact. The following section provides a summary as to how the research questions were addressed and answered based on the body of work presented within this thesis.

Responses to Research Questions

RQ1: How can DIY/DIWO media architecture be designed?

The question about the design of a DIY/DIWO media architecture has been responded to in chapter 5.2. Although the level of “DIY/DIWO” has to be negotiated due to logistical challenges such as property ownership and approvals, time and budget constraints, it was still possible to design the InstaBooth with others. The co-design process of the InstaBooth highlighted that different disciplines within design employ a range of techniques and processes to explore design ideas, however most effective was the use of drawings and scaled prototypes to communicate ideas across disciplinary backgrounds or knowledge base. A 1:1 scaled prototype of the InstaBooth allowed the interactive components to be designed in

parallel to the physical structure. Through the process of working collaboratively and across disciplines, the InstaBooth became a viable and robust prototype which has survived nearly ten different deployments in different locations around South East Queensland. The media content that is created through the InstaBooth is completely dependent on the contributions of the people who use it and the questions that were asked were developed in collaboration with the community partners. By publishing about the InstaBooth, providing the design files with international colleagues and peers, and sharing the experience with as many people as possible we aim to learn more about the DIY and DIWO aspect of the InstaBooth to continue to push this element of media architecture further.

RQ2: How can a DIY/DIWO media architecture approach be implemented?

The paper in chapter 5.3 responds to RQ2 by discussing the ways in which the InstaBooth, a prototype of DIY/DIWO media architecture, has been designed, constructed, and deployed in public urban spaces around South East Queensland. The paper responds to the guiding principles presented in the literature review, chapter 2.2, discussing how the InstaBooth was developed as a DIY/DIWO media architecture prototype and then evaluating the success of the InstaBooth by emphasising its ability to allow for participation, adaptation and appropriation by the users. By presenting the InstaBooth as a mechanism to ask questions of people, the nature of the questions, who is asking them, and how they are being asked becomes a critical aspect of implementing a DIY/DIWO media architecture that requires the input of participants.

RQ3: How does media architecture impact on place?

The last research question examines the impact of media architecture on the experience of place. To respond to this question the ability to understand the motivation of users to participate and engage with the InstaBooth was critical. Through the thematic analysis of interview data it became clear that the InstaBooth did impact on the sense of place and community for most participants. The InstaBooth provided a platform which allowed

participants to voice their ideas or issues allowing them to feel more connected with other people within their community. They were able to learn about and from the concerns of others and were able to see the different needs of people from other parts of their community who they were not aware of. The ability of participants to control the level of engagement with the InstaBooth provided another dynamic to the type of interaction they predominantly had with it. This ability to control how they expressed themselves and to what extent provided a high level of respect and enjoyment of the InstaBooth and the process of responding to its questions. These factors instilled a sense of agency and empowerment for the InstaBooth users which ultimately affected the experience they had within and around it which created a sense of place and connection to the community.

RQ0: How can media architecture facilitate the co-creation of place?

Addressing the overarching research question of this PhD study and from the design interventions it can be concluded that media architecture can facilitate the co-creation of place by providing a means through which people can communicate with one another in an open and accessible manner. By doing so people have expressed themselves, they have shared their ideas and concerns and learned from one another. The experience to learn from others in an honest way, such as with the InstaBooth, has shown that people are delighted to find that others are “*on the same wavelength*” (RebeccaPOMONA) and by finding a common ground within one’s community may help to inspire people to work together, be more active, participate more in one’s community and make their communities a better place for all.

What is critical to highlight here is the ability to co-create place that the messages and drawings captured and displayed in the InstaBooth not only creates a meaningful experience for the solo person who left a message behind but acknowledging that the message or drawing will inspire someone else to see the world in a different way. The experience of place changes and is not an individual construct but something that has been co-created or done with others.

Contribution to Knowledge

“When architecture and mediatecture successfully engage with one another at this point, magnificent results can be expected...This vision naturally implies that the intention for a medialization of architecture is not simply accomplished with the application of a media, rather that architecture itself must become a medium...that connects with people and their ideas instead of a competitive exploration of the physical limitations of buildings,” (Kronhagel, 2010, p. 441).

This shift in perceiving media architecture as a technological innovation to a means through which people can connect with one another and the built environment in which they live is particularly relevant at a time where the use of digital technology is ever increasing and impacting on all aspects of our lives. The significance of this study occurs at the intersection of technology, people and place. Researchers, academics, and practitioners are grappling with striking a balance between the use of digital technology not only in design and fabrication processes but in the built form. Users of buildings and public spaces are also challenged by ever increasing competing demands for their attention through the mobile devices in their hands, the urban screens, billboards, and digital signage that are plastered on more parts of the city. Increasing affordability of mobile technologies and LCD panels has caused this expansion of digital displays in public spaces (Memarovic et al., 2012). This overwhelming exposure to information and entertainment can cause display blindness where viewers lose interest and ignore such displays (Huang et al., 2008; Müller et al., 2009; Memarovic et al., 2012). However through a participatory approach there is an opportunity to explore the combination of media, where I propose that the users of mediated urban spaces can establish a sense of place through the collective and collaborative process of interacting with and communicating through media architecture. This research is relevant to architects, urban informatics, urban designers, urban planners, interaction designers, and others involved in the creation of the built environment and cities for the purpose and experience of people. It is for those who are concerned with the role of digital and tangible media in place making and community engagement.

Moere and Wouters (2012) examine the contextual challenges of existing media architecture examples and propose that more research is required to consider the impact and implications of media architecture on society, culture, architecture, economics and the urban environment. *“Additional research should lead to new evaluation methods that measure the real value and potential of media architecture, by building upon the further analysis of real-world cases in a variety of complex urban contexts. This will include analyzing the typical design processes, capturing the actual perception by the general audience and determining its real impact on the urban fabric,”* (Moere & Wouters, 2012). This thesis provides significant contributions towards uncovering the potential and ability of media architecture to be context specific and provide meaningful outcomes for its users as discussed in the following sections.

Media Architecture & Theoretical Contribution

The literature review and the design interventions within this thesis provide theoretical contributions to the media architecture discipline by proposing the concepts of *hybrid place* (Chapter 2.1), *ambient media architecture* (Chapter 4.1), and *DIY/DIWO media architecture* (Chapter 2.2 & 5.2).

Hybrid place extends the theories of place and hybrid space to that of hybrid place which is an attempt to recognise that a place can be experienced both virtually and physically, highlighting the role that access and connection to technology has in our everyday lives. From an architectural and design perspective this almost constant connection to the digital layers while occupying physical spaces needs to be acknowledged as part of the experience of the cities and buildings we live, work and play in. This connection to technology should be taken into consideration when designing buildings and cities however seeking the opportunities that can be provided through the access of information or communication streams needs to also be part of the design process.

Ambient media has been discussed for many years however in chapter 4.1 we introduce a subset of media architecture which focuses on the design of ambient media architecture. The study of design intervention 1, proposes that ambient media architecture has an opportunity to augment public library spaces by revealing the hybrid personal learning environments of co-located library users. By making such information visible, the ambient media architecture would have a role to play in helping stimulate face-to-face encounters and for people to connect with one another within physical space.

This thesis proposes the concept of DIY/DIWO media architecture as a subset of the discipline. This concept specifically examines the abilities of users and stakeholders to participate in the design, development, implementation and content creation of media architecture. A DIY/DIWO approach to creating media architecture has been tested through the development of the InstaBooth. The findings indicate the challenges and benefits associated with this participatory and co-design approach to media architecture.

Design & Technological Contribution

Technology is ubiquitous and through it information and data are abundant. The purpose of this study was to acknowledge the impact of technology and the affordances it provides to the design and experience of the built environment through digital and tangible media. As discussed by Tolva, “...*there is a role for this kind of training in architecture and urban planning schools. We need to move away from thinking of technology solely as a tool to make the built world. It is a material now and should be designed and shaped the way we do walls and streets,*” (in Stott, 2013).

The discipline of media architecture is growing and more researchers are focusing their attention on this field as it exemplifies the increasing trend towards trans-disciplinary design practices as a result of technological developments. Each design intervention discussed in this thesis document rely on a design approach to research and have involved contributions and collaborations across disciplines and

stakeholders. Participation has been the backbone of each intervention and has fostered the bridge across competing interests or differing perspectives. The design process has employed a range of low to high technological devices, instruments, materials and tools. The combination of participation with digital and tangible materials and technologies has provided innovative outcomes at each stage of the PhD research.

While presenting the “Defining the InstaBooth” paper (section 5.1) at the MediaCity 5 conference a colleague asked what motivated the different stakeholders particularly the academics from different disciplinary backgrounds to work on the InstaBooth project. This caused me to reflect on the issue and made me realise that the design process was a valuable aspect of the InstaBooth project to share with others. To date in the media architecture discipline there is little published documentation or accounts of the design process involved in creating and combining media and architecture across different disciplines. Therefore chapter 5.2 is an attempt to enlighten this area with detailed explanation of the design journey of the InstaBooth to highlight the challenges of maintaining enthusiasm and interest across disciplines while having competing interests and commitments. It also reflects on the benefits of a cross-disciplinary approach to design. Fundamental to the InstaBooth project was acknowledging the participation of all the people who contributed to it, which was done through the design workshops. Employing and welcoming a range of materials and design approaches also assisted in communicating ideas through prototyping and bodystorming. The possibility of open-sourcing design files and ability to employ digital fabrication technologies such as CNC routing were critical factors in the design decisions as they impacted on the construction techniques, material selection, size, and overall aesthetics of the InstaBooth.

In the recent publication by Peter Dalsgaard, Kim Halskov, and Alexander Wiethoff (2016) a set of tools and approaches for the design of media architecture is presented where they claim that, *“there is both an unprecedented opportunity and an urgent need for knowledge sharing regarding how the challenges of designing Media*

Architecture may be systematically addressed to support and accelerate the further development of this emerging domain” (pg. 2571).

By documenting the decisions and the design process of the InstaBooth in a published paper that was presented at the Media Architecture Biennale 2016 (June 1-4) I believe our project makes a significant contribution to the media architecture discipline by enforcing the concept of DIY/DIWO media architecture and the feasibility of designing in a participatory and open manner.

Social and Community Contribution

The impact of media architecture on the social and community aspects of the situated contexts in which they are located has yet to be explored in depth as this emerging discipline is just starting to mature. The findings of this thesis indicate that the potential for media architecture to encourage a connection to place and sense of community is possible. Additionally through its inherent combination of media with physical structures and space, media architecture can provide meaningful communication channels for people to use with each other and decision makers when allowing for participation, appropriation, and adaptation. Through the InstaBooth we have evidence that it did provide social interactions to occur and enriched the sense of community within the locations it was deployed as discussed in chapter 5.4.

Defining Media Architecture

At the recent Media Architecture Biennale 2016 held in Sydney researchers and practitioners, presented their current work about media architecture. During this event it became evident that the field of media architecture is loosely defined and as a discipline is evolving. Reflecting on the definition used within this thesis (chapter 2.3) and the papers written within it, media architecture was defined by Brynskov et al. as, *“Media Architecture is an overarching concept that covers the design of physical spaces at architectural scale incorporating materials with dynamic properties that allow for dynamic, reactive or*

interactive behaviour. These materials are often digital, but not always, and they allow architects and (interaction) designers to create spatial contexts for situations using a variety of modalities,” (2013, p. 1-2).

Acknowledging that through its scale, architecture has an impact on the spaces people use. Media, through its multiple forms and definitions is a broad concept which can be interpreted and implemented through a vast range of methods and approaches. Combining these two very rich and broad concepts is challenging and sometimes difficult to understand and comprehend. The individual disciplines of architecture and media have extensive theories and histories which must be recognised. When merging the two areas with each other we should aspire to create a sum greater than its parts. There is a need to better articulate what media architecture is and what it is not to avoid further confusion and to direct this evolving discipline towards more meaningful and positive impact on the built environment.

Building on the previous definition and based on the explorations and research findings within this PhD I propose my definition: *Media architecture is the merging of media (digital, analogue, or tangible) with the design of physical structures and spaces for the purpose of communication, engagement, interaction, or expression. Media architecture can be created by architects, designers, artists, individuals or communities allowing the formation of dynamic spaces that inform the experience of place.*

The definition I offer is more focused on the reason for which media and architecture are combined, causing the creator to reflect on what the outcome and impact of their media architecture would be on the space in which its located. This definition also extends the creator beyond an architect or interaction designer to include anyone regardless of their discipline, profession or affiliation with the ultimate focus to improve the quality of the space through the experience of end users causing the creation of place. This definition acknowledges that media architecture can be approached and created from the bottom-up, middle-out, and top-down. Regardless of the instigator this definition focuses on ultimately creating place and enriching the experience of the user within public spaces through the creation of media content. This provides and allows for artistic expression, community engagement, information sharing, or communication exchange. I argue that media architecture is not digital signage or advertisement on urban screens as these two areas have

little recognition or consideration of the end user, the quality of the media content, or the purpose for the combination of media and architecture to create meaning or place.

Limitations

Conducting the thesis by publication has been an effective way to stay on track and work towards deadlines set by conference, journal, or book reviewers. This process allowed me to work quickly and get peer review feedback on the design interventions and the papers I have written along the way which is major benefit of conducting a PhD by publication. However there are also some limitations to the process which tend to impact on the amount of content which has to be repeated throughout the different papers. The key theories and definitions of such terms as media architecture or participatory design become repetitive throughout the thesis causing the novelty to wear off rather quickly for the reader. The other challenge has been the linking of the different papers, although all are related to each other the construction of a coherent story was difficult to achieve. Working collaboratively on the projects and publications has been beneficial in many ways providing the ability to learn from the different perspectives and approaches from my peers however there are limitations to this way of working which should be acknowledged as well. In some instances the theories or background knowledge of co-authors have influenced the terminology utilised in some of the papers which are not central to this thesis and can be seen to deviate the focus of the research.

The amount of data collected by the InstaBooth for each deployment has been extensive however due to constraints on time and capacity the majority of the data such as the paper notes, the drawings, tweets and text messages are not analysed in depth for this thesis. Although my intention from the onset was to include the drawings and notes contributed by participants it became clear that those particular parts of the data did not respond to my research questions. They did tell us the issues that participants had within their community, their visions of the future and their ideas which provide valuable insight to the stakeholders who were asking the questions yet the data set did not reveal much rich information regarding the motivation or meaning that the InstaBooth provided to the participant. This part of the data does reinforce the necessity of providing a hybrid (digital and tangible) media approach to community engagement.

This research was all conducted in South East Queensland and I recognise that this could be seen as a limitation. The research could have benefitted from exposure to greater cultural diversity. Time is always a challenge and has been a limitation to this research which was conducted on a part-time basis while being a full-time lecturer. During the candidature I also undertook 8 months of maternity leave which did cause some disruption to the flow of the design interventions and the thinking process between them. I believe that a longitudinal study within the community where the InstaBooth was deployed would provide deeper insight into the impact of media architecture. I would like to examine how people perceive the impact that the InstaBooth had on the community, 6 months and one year after the initial deployment. This would highlight any long term effects of the design intervention or whether the impact of such an approach to community engagement and place making was purely temporary and only evident during the deployment.

Could it have been different?

As I embarked on this research journey I admit that there were many uncertainties and many questions. As I progressed and became aware of current research areas that were relevant to my interests I did align myself to particular schools of thought such as urban informatics and media architecture because these areas made the most sense to me. I acknowledge that there is some tension within this thesis where I argue for the InstaBooth as an example of media architecture and others could see it as work that would fall under public displays. By positioning the research here especially with the InstaBooth as media architecture my intention was always to question what media architecture actually is and what it could be. My disciplinary roots come from architecture and I wanted to remain within that context of the familiar yet also unknown when combined with media architecture. The decision to strongly position within this field can be seen as a limitation as there is plenty to consider in the area of public displays research which is missing from this thesis.

The manner in which the design interventions unfolded were in some ways opportunistic and could have been done differently and probably in more effective ways. Particularly design intervention 1 & 2 were done with the resources at hand and were not overly planned so acknowledging that these two could have been more developed is certain. We could have asked more questions and tested them with more people or in more diverse contexts.

However I believe these two interventions were quick and dirty and that is why they worked well. We got a lot from them and I learned so many things from each not only by collaborating with my peers but in terms of data collection, data analysis and synthesis. They did influence the decisions made with the InstaBooth such as the combination of media and the importance of allowing people to draw as a valuable source of data.

With the InstaBooth, there is no doubt that it could have been done very differently. We continue to consider how else it could be, how it could be better, and easier or more effective. Upon reflection I believe there are three main characteristics of the InstaBooth which are its essence and make it work well. These are; the ability for people to interact with the combination of digital and physical media, the ability for people to control the level of engagement, and the benefit of creating a space that is open yet private within public spaces. Adhering to these characteristics would allow any design to work well as a community engagement tool. In terms of pushing the research further and better aligning the InstaBooth with media architecture I think that it could have more digital media embedded in its physical design such as lighting, particularly responsive lighting.

Although the first two design interventions informed the third, each could have been pushed further and explored more on their own individual basis. Having done that would most certainly have lead to very different outcomes, what they would have been I am not sure of. Reflecting upon the contributions of my peers and colleagues, they did influence the directions of the work in the same ways that I influenced their work. Had I done all of these design interventions on my own I don't think I would have been able to complete as much in the given time-frame nor would they be as effective. The contributions from my colleagues in interaction design have been invaluable in creating the interactive modules but also they provided other disciplinary background and knowledge that I have learned from. If the InstaBooth project did not exist (if there was no funding for it and no team to work with) the design intervention I would have created on my own would have been simpler. It still would have been a physical structure that was digitally fabricated but probably much smaller and would have focused on one combination of the digital and physical interaction, not many different ways at once. Would the results be the same? No I don't think so. The results of the this research are particular to the different actors who contributed to the interventions, the

contexts in which they were located, and the questions that were asked. I am thankful for having had the incredible opportunity to have worked with and talked to so many different people due to the design interventions and their contributors.

Future Work

There are two key aspects from this thesis which can be investigated further. The detailed analysis of the written notes or hand drawings collected in the InstaBooth were not included in this thesis because that data was out of the scope of the thesis and did not address the research questions. In future work these data sets can be explored further. Secondly the findings regarding the different user types (advocate, learner, playful and curious) can be extended and compared to the findings of researchers in the areas of public displays. Future research work will continue to expand on the findings in this PhD to elaborate further on the potential to increase the capacity for citizens to voice their concerns and express higher levels of agency and control over their needs and communities. Of particular interest is investigating the needs and providing a voice for the aging populations of Australia who face different levels of what is called the digital divide.

The Instaboost project has attracted the attention of many people through the publicity achieved via the ABC, newspaper and online articles that have shared the purpose and deployment information with the city. Through these media outlets, word of mouth, and its sheer physical presence the project team has been approached by a range of interested stakeholders and communities wanting to use the InstaBooth as a novel or innovative form of community engagement. In November 2015 the InstaBooth was used in collaboration with the Queensland Office for Women conducting community consultation on the women's strategy. The consultation was endorsed by the Minister for Communities, Women and Youth, Shannon Fentiman. The findings from the consultation directly informed the Queensland Women's Strategy released in March 2016 and can be found here: <https://www.communities.qld.gov.au/resources/communityservices/women/queensland-womens-strategy.pdf>. This collaboration and level of interest in the InstaBooth indicate that media architecture can assist to promote creative and participatory approaches to community engagement which can be applied to inform policy making, urban development, and change management.

Through the open sourcing of the design files of the InstaBooth currently there are four international versions in the making in Peru, Ireland, China, and the USA. Once they are completed and have been deployed comparative studies and collaborations with international colleagues will assist to continue to understand the effectiveness of a DIY/DIWO media architecture approach to community engagement and its impact on place. The different cultures and their responses to such design interventions will be of particular interest. Another key aspect to investigate would be the use of technologies to provide digital connections between the different InstaBooths across the continents and how these connections enhance or deter the experience of users.

The finding that the InstaBooth provided hope for the future for participants indicates that there is a necessity to continue to build on this hope and ultimately strive for better places for living, working, and playing for all.

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