DISCOURSE, SPECULATION AND DISCIPLINARITY: DESIGNING URBAN FUTURES

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ABSTRACT

This paper presents a design case study of a summer school that brought together a multidisciplinary group of early-career professionals to explore ideas relating to new technologies in an urban context. The organisers of the summer school took an explicitly design-informed approach to the event, specifically a 'critical design' approach. The aspiration of the organisers was that the school activities would lead to the creation of an exhibition of artefacts and visual media expressing the ideas explored during the school. The expectation of generating exhibition quality outputs influenced the participants' experience of the event, and this paper describes the process and reflects upon the success of this method. The authors address the question: in what way is it useful to adopt a critical design approach with a multidisciplinary group in a workshop or school setting? It is suggested that envisionment in the form of 'design fictions' is key to the success of this approach.

INTRODUCTION
Urban environments are becoming augmented with a myriad of novel networked technologies. The design of products and services that are built upon these data infrastructures is an increasingly complex research field, requiring the engagement of stakeholders representing many disciplinary domains. The "smart city" as a design context is rapidly becoming a familiar setting for designers. However, as an evolving area of practice, issues and questions are emerging that are yet to be fully examined and resolved, particularly where interactions involving people and technology are concerned.

This paper describes an eight-day summer school that brought together a multidisciplinary group of researchers and practitioners to explore and envision the nature of the future city from the perspective of urban interaction design. The summer school was organised as part of a EU project entitled UrbanIxD that was funded under the FET Open initiative. The wider goal of the project was to build a sustainable community of practice and map out a research agenda for the field of urban interaction design. The project adopted a design-informed approach throughout, and the summer school was explicit in its use of critical design as a means of envisionment and articulation of ideas.

DESIGN - WHAT IS IT GOOD FOR?
The prevailing view of design as a profession is that it serves society through the creation of objects that are either useful or beautiful, and sometimes both. This view, as famously expressed by the influential 19th Century designer William Morris, has become the

dominant image of the design profession since the growth of industrialization and mass production in the developed world. This sets design apart from the related activity of art in that it concerns itself with the production of marketable objects for consumer consumption, rather than for the expression of ideas or concepts (Dorst, 2003)

Adrian Forty, writing in the "pre-digital" mid 1980s, claimed that not enough attention was paid at that time to (industrial and product) design's influence on how we think (Forty, 1986). While the effects of contemporary media such as television, journalism, advertising and fiction on our collective minds seemed to be of great public concern, the power of design to influence seemed to pass unnoticed. On the contrary, according to Forty, the design of the objects that surround us every day asserts a strong influence on how we think, and this effect on us, as individuals and as society, should be recognised. "Far from being a neutral, in-offensive artistic activity, design by it's very nature has much more enduring effects than the ephemeral products of the media because it can cast ideas about who we are and how we should behave into permanent and tangible forms" (Forty, 1986 p6).

However, more recently the purpose of design has been questioned and examined as practitioners have been employing design methods for purposes other than the production of new artefacts for the marketplace. Particularly in the domain of technology, design has been used as a method to express, communicate and reflect on ideas and concepts. We have now arrived at a situation where the worlds of art, design, technology and media have converged, creating a new language, a new methodology with which to examine the world as it exists and as how it might be. Constructive design research has played an instrumental role in this development (Koskinen et al, 2011). This confluence of domains, and the accelerating pace of technology developments is a contributing factor to why more and more designers are adopting a more fluid and experimental approach to design. This new breed of designers engage in hybrid practices, and blur the boundaries of the disciplines (Rogers & Smyth, 2010). These designers use their craft to question as well as to create.

The Croatian designer, Dejan Kršić, explains that, "in the age of digitalization, virtualization, when the design of mass-produced objects is more and more replaced by designing services, interfaces, interactions, etc., design should be observed as discourse, discourse practice." He stresses that "works of design cannot be viewed as just static and pretty objects made by some genius author. 'Products' of design are events in time; they change meaning, roles, uses, and functions"(Kršić, 2014). Speculative design, as practiced by Dunne & Raby (2014), can be categorized as discursive design practice, since it is rooted in the critical and reflective thinking and discussion, which questions design itself as profession. Anthony Dunne

and Fiona Raby suggest that through new speculative design practices "we might see the beginnings of a theoretical form of design dedicated to thinking, reflecting, inspiring, and providing new perspectives on some of the challenges facing us" (Dunne & Raby, 2014)

SPECULATING THROUGH DESIGN

As design emerges from the world we physically and collectively inhabit, it plays a central role in our lives. In this way it holds up a mirror to allow us to examine contemporary society. As design is also the conceptual product of people with opinions, concerns and values, it can point ahead to how things could be, or should be. By presenting alternative visions of what our shared futures might be, and through reflection upon these visions, design can reveal what is important to us in the present. The critical design approach in particular, along with its close relatives, speculative design, discursive design and design fictions puts design practice to use explicitly in the creation of designed catalysts or provocations. These challenge us to ask questions and consider the world that these designs might inhabit (Auger, 2013).

The various different practices and terms are increasingly discussed and described. James Auger, (Auger, 2013) who positions his own work as speculative design, acknowledges that this term is open to several interpretations. Discussing speculative design in relation to alternative and related approaches such as critical design, discursive design and design fictions, he states that the common thread is the ability to "remove the constraints from the commercial sector that define normative design processes; use models and prototypes at the heart of the enquiry; and use fiction to present alternative products, systems or worlds." This definition works very well to describe the approach of the UrbanIxD Summer School. To this list it is worth adding adversarial design an approach that takes a rather more political stand in that it places value on conflict or agonism. Carl DiSalvo suggests that struggle can be harnessed as a positive force, and that adversarial design is a "kind of cultural production that does the work of agonism through the conceptualization and making of products and services and our experiences with them." (DiSalvo, 2012)

THE PURPOSE OF DESIGN

As a professional activity, design tends to be cast as a method of finding solutions to problems. This is achieved through the description of goals and the analysis of constraints, leading ultimately to the production of designed outputs. Design problems can be 'ill-defined' (Simon, 1973) or 'wicked' (Rittel & Webber, 1972). They do not always have an optimal solution and the problem always cannot be precisely specified (Fischer et al, 1991).

The analysis of why certain solutions perform better than others is an integral part of the design process, and

successful design relies on critical analysis early and often in the lifetime of the activity. One way to tackle this is the creation of alternatives that, through their making process, enable a better understanding of the design space. Juhani Pallasmaa, in The Thinking Hand (Pallasmaa 2009) characterizes this as the manipulation of both physical and conceptual materials in order to achieve a better understanding through the internal reflection on and exploration of ideas.

CRITICAL DESIGN & DESIGN FICTIONS

Design practice is conventionally grounded in reality and in the possible. Critical design exploits these pragmatic limitations to question our assumptions and preconceptions about the roles that products and services play in everyday life. The creation of fictionalised designs is a strategy for exploring the space that lies tantalisingly beyond the current and the now. By situating design prototypes at the edges of our knowledge, it is possible to create 'design fictions' (Bleeker & Nova, 2009). Bruce Sterling (2012) describes these potential objects and services as 'diagetic prototypes'. Just as props are used to support narrative in cinema, these prototypes are intended to suspend disbelief. The role of design fictions is to activate the imagination rather than to specify technology or make particular claims about the future. By extrapolating current weak signals into the future, design fictions confront us with the now as well as the possible by tracing out the often conflicting trajectories ahead. The key attribute of design fiction is its ability to start conversations around this tension between present and future(s) (Bleeker, 2012). The fictions create stories that unpack and humanise the future, enabling us to focus on the minutiae of behaviour and the subsequent questions and discourses that are raised through the exposure of our needs, desires, habits, rituals, values and priorities. With this explicit emphasis on the future, both critical design and design fictions offer a natural fit for considering future visions of the networked hybrid city.

ARTICULATION AND BRIDGES

The articulation of ideas is central to the critical design approach, supporting dialogue that can occur either reflexively and internally or within a group. For example, this could involve the presentation of models and prototypes that describe concepts in tangible form to an interdisciplinary, collaborating team. Here the designed artefacts facilitate reflection and discussion around shared conceptual visions. This position is supported by the work of Nigel Cross whose study of a group design process reported the impact of a single phrase and how that continued to influence the design thinking over an extended period (Cross 1996). Cross interprets this as language forming a 'bridge' between problems and solutions. Whether such articulation takes the form of sketches, physical models or sophisticated CAD renders, each representational medium helps to formalise abstract thoughts or, as Donald Schön describes, the designer 'having a conversation with the situation' through the medium (Schön 1983). Critically, this conversation can occur with others but also as an internal dialogue.

DESIGN AS COMMUNICATION

In the domain of exhibition curation there is a growing trend towards explicitly foregrounding design as a means of raising public awareness of the scientific and technological advances happening now, as well as those that may happen in the future. An example from 2008, is the acclaimed exhibition "Design and the Elastic Mind" at the Museum of Modern Art (MoMA) in New York which presented a message of 'progress through design allied with science' (Cogdell, 2009). In this case, designed objects and interfaces are the focus of the exhibition, conveying ideas and inviting consideration of the desirability or otherwise of the possible future world.

The What If? exhibition curated by Dunne & Raby (2009) was commissioned by the Science Gallery in Dublin, Ireland, to explore interactions between design, science and the future. The exhibition later became part of the Beijing International Design Triennial in 2011. While commenting on the relationship of design with science, one of the exhibitors discussed how such an approach has the potential to reveal the detail of the human-centred response to such interactions. "We can use design to inspire, raise awareness, stimulate discussion, and provoke debate, all of which can help achieve technological futures that reflect the complex, troubled people we are, rather than the easily satisfied consumers and users that we are supposed to be." (Dunne & Raby, 2011).

THE URBANIXD SUMMER SCHOOL

The summer school was an activity of the UrbanIxD FP7 project (2013-2014) funded by the European Commission. Critical design as a methodology was core to the approach of the project as its intentionally forward-looking stance naturally aligned it as a mechanism for exploring and describing the research topic of urban interaction design. The design nature of this approach, as discussed in the preceding section of this paper, encourages/demands the articulation and envisionment of ideas and it is through this process that 'conversations' as referred to by Julian Bleeker can emerge (Bleeker, 2012).

BACKGROUND AND MOTIVATION: URBAN INTERACTION DESIGN

The UrbanIxD project was tasked with building a community of researchers and practitioners in the emerging discipline of urban interaction design, a topic related to the current trend for 'smart cities' research. Urban Interaction has as its focus, the point of interaction with, and between, humans in the technologically augmented urban space of the future.

This is becoming an important field of research and one major challenge to be faced is the intrinsically - disciplinary nature of the domain, broadly encompassing such fields as urban design, technological systems and social sciences (Figure 1). For such research to proceed in a fruitful manner, it is vital that these domains build shared understandings and express common goals, even though each of the domains has very different methods of practice and ways of expression. This is a long-term process but the UrbanIxD project aimed to contribute to this activity by supporting community building activities, and the summer school was one such event.
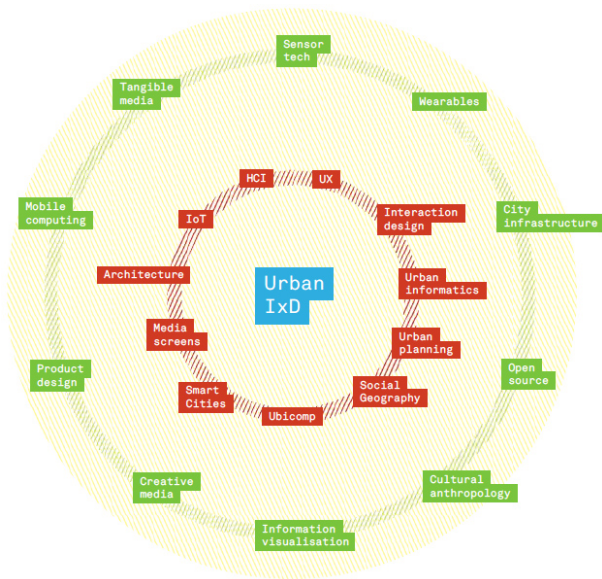

Figure 1. Urban Interaction Design disciplines (from Helgason et al, 2013)

The summer school was a chance to seek out those indicators and signs that just might provide insight into our shared urban futures. Through the guidance of experienced atelier leaders, the participants were encouraged to step out of their familiar disciplines and to go beyond the limits of design definitions, and to explore the present role design plays in society through critical design practice. For the project, the success was measured in terms of the connections, links and communications that were initiated during the school, and continued afterwards.

PUBLIC EXHIBITION
Alongside this goal of community building was the aim of creating a public exhibition to capture and express the ideas and discussion from the school. Since the summer school event, this exhibition has been developed and refined as part of the UrbanIxD project's work. The works created at the summer school formed the basis of this showcase, titled; City | Data | Future, Interactions in Hybrid Urban Space. At the time of writing, the exhibition has been exhibited in Italy,

Croatia and Denmark with further events in the planning stage. The fact that the work produced was of public exhibition quality served as one indicator of the success of the summer school process.

THE PARTICIPANTS
The summer school attracted a multidisciplinary group of forty early career researchers and practitioners from across Europe, and from further afield, who were selected from over two hundred applicants. The school was conceived as a multidisciplinary event, and participants were selected to achieve a balance of representation. They were mostly 'early career' researchers, practitioners and academics across a range of fields. Some were in their first few years of employment post education, others were post graduate students were expected to be influential in this emerging field in the future, (Figure 2). The participants in the eight-day school collaboratively addressed key issues for interaction design in an urban context. Each had an opinion on the topic of the school and each was grappling with the problem to better understand its complexities, within the framing of their own particular domain and professional interest.
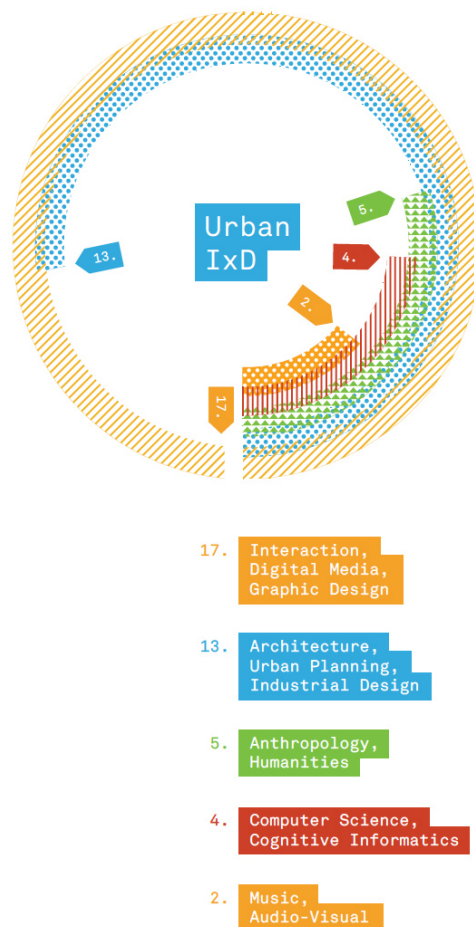

Figure 2: The spread of disciplines represented at the school. (from Helgason et al, 2013)

WHAT HAPPENED AT THE SUMMER SCHOOL

The summer school took place in Split, a coastal town in Croatia. The participants were allocated to four atelier groups of 10 participants, each lead by an experienced interaction designer. (Carlos J. Gómez de Llarena, Gordan Savičić, Chris Hand, Tobias Revell). Many of the participants brought creative skills such as video, sound and graphic design. They represented disciplines including architecture, urban planning, psychology, anthropology and computer science - all fields of relevance to the interdisciplinary topic of Urban Interaction Design.

ASPIRATIONS FOR THE SUMMER SCHOOL

The summer school had an explicit focus on learning by doing, the goal being that participants would learn about the emerging field of urban interaction design by working in multidisciplinary atelier groups. While the focus was on concept development, there was always the desire to articulate the concepts in the form of developed prototypes. These did not necessarily have to be fully functional, but the expressed aim was that they should encapsulate key aspects of the concepts discussed within the groups.

However, in retrospect, the aspiration towards finessed prototypes was unrealistic, especially given the short time frame and diverse nature of the participants' skills, the open nature of the brief, and the breadth and complexity of topics that emerged in discussions. Instead, during the second half of the school, rather than producing prototypes, the groups worked on narratives that contextualized their thinking and gave it form, albeit fictional. This approach had a liberating effect, as the design fiction format offered an appropriate platform for the multidisciplinary teams to produce short videos in a very short time frame. In addition to each production accommodating the multidisciplinary team with a range of different roles, from acting, to designing, animating, editing etc., it was possible for the teams to save time by carrying out tasks, such as shooting and editing, in parallel.

FROM PROTOTYPES TO FICTIONS

It was observed that the summer school participants experienced a shift in terms of outcome, from the original intention of producing developed prototypes, to a result consisting of design fictions using a video format. This shift is reflected in the terminology used in this paper, as critical design is used in the context of the methodology introduced and practiced during the summer school (process) while the outcomes are discussed as design fictions. We characterise this point as the transition from one phase to the other as one of the key points of this paper. While we do consider the collective outcome of the summer school as a speculative design project, we refrain from further discussion regarding terminology and semantics in the summer school context, as the aforementioned key transition is first and foremost of a practical nature.

This shift from physical prototypes towards design fictions is a timely reminder of when to prototype during the design process, and when to think at the broader conceptual level. Each phase is essential, but each can beguile and seduce the unwary, resulting in beautiful but meaningless prototypes, or fantastical concepts with little grounding in the possible. For the summer school participants, exposure to the concept of fictional narratives, and their potential to ground future concepts and 'what if' questions in stories of the everyday was an important moment in the course of the summer school. Within the very short timescale, and with this multidisciplinary group, this way of thinking freed them from the pressure of refining and distilling complex concepts into simplified physical forms that would not adequately reflect the richness of their discussions nor the questions they raised. It should be mentioned that some of the groups did also produce objects that accompanied and supported the fictional narratives, adding substance to the final exhibition.
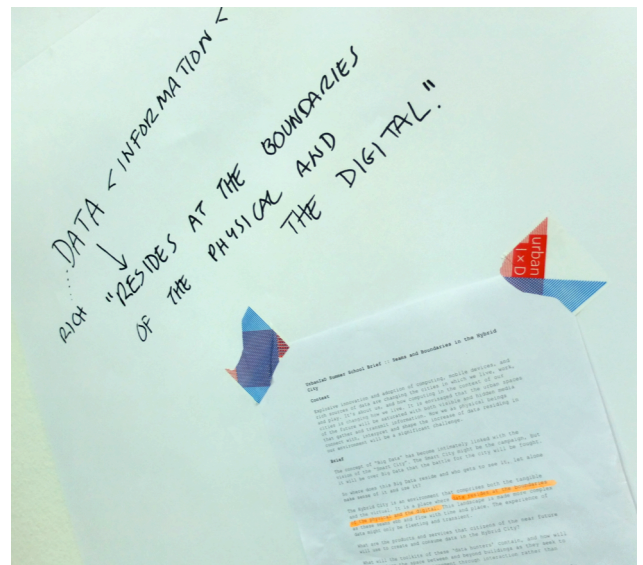
THE BRIEF

Figure 3: The brief, annotated by participants.

The groups were all given the same brief (figure 3) to work to, titled "Seams and Boundaries in the Hybrid City". This brief asked the participants to address the themes of big data, the smart city, and the hybrid physical/virtual nature of the near future urban landscape. More specifically, the brief asked the participants to consider the products and services that citizens of the near future will use to create and consume data in the hybrid city - toolkits to identify and explore the seams between the physical and the digital.

THE WORKS AND EMERGENT THEMES:

The works that were created at the summer school were exhibited to the public and to an invited audience at the end of the week in the school venue. They were documented and recorded on a dedicated website

(www.urbanixdsummerschool.eu). In total, the four atelier groups created 15 works. Each atelier group presented their series of works under a title. The four titles were; Humanside, The Hybrid Citizen, Big Data and The Displaced City.

As the UrbanIxD project reflected on the works, after the summer school, during the subsequent exhibition preparation and catalogue writing process, several themes and topics became apparent, including: alternative economies, quantification of the intangible, meditated social connections, exchange, value, perception, interpretation and knowledge. These were summarised under three topics; City, Data and Future, which became the title of the exhibition – City | Data | Future, Interactions in hybrid urban space. The following sections describe some of the exhibition concepts through the framing of these themes. Further detail is in the exhibition catalogue (Mitrović, et al 2014).

THEME: CITY

THE VIEW FROM ABOVE AND FROM BELOW

The summer school narratives were situated within fictional future cities, and some were given names; Ameurasica, Nokuna and Aurora. In these cities technology is everywhere, embedded and ubiquitous, it reads citizens' minds, controls their movements, communicates feelings, and it is accessible to everybody. In these visions of future cities, people are often reduced to nodes within the vast mesh of information. They are living sensors, emitters or receivers of data in the hybrid city network. Systems are planned, designed, implemented and regulated, but the design fictions often explored what might happen when systems connect with the real, human, social sphere.

Figure 4. Ameurasica, The Displaced City

In Ameurasica, (figure 4) an explosive megalopolis of 128 million inhabitants, the year is 2063. People have organized themselves into district-states: cities within the city. To coordinate these networks of urban patterns and infrastructural resources an overarching Urban Operating System has been built. This UOS is able to run each of the city's district states but it also tracks its citizens via a fleet of geostationary telecommunication drones.

Whenever officially sanctioned and authorised systems are implemented, there are reactions to these systems. Whether these reactions are considered as hacking and abusing, or modifying and appropriating, depends on a particular point of view. These activities taking place at the edges can be both disruptive and powerful. In the 'Future Cloud is Buried' scenario, the citizen is portrayed as an active agent, challenging the boundaries that the city has placed around the data that citizens themselves have created. In this narrative, the future city has buried all of its local, most valued data in an off-grid cloud just outside the city. A personalised, DNA activated, physical interface allows citizens to access only their own precious data from the past, but hackers work out ways to plug in and experience immersion in forbidden data. This underground approach to accessing illicit data gives birth to a new pirate tourism industry as well as a new drug scene.

Acting with more overt political motivations, the 'Ministry of Misinformation' is an emergent digital movement that also aims to subvert the official representation of reality by distorting real-time urban data. These City Hackers act as a collective, and subtly subvert digital information to change how others interact with, and perceive, the city. They play with data to create confusion and serendipity, to destroy but also to inspire.

THE PUBLIC DOMAIN

The 'Coordination of Urban Busy Areas' (CUBA) scenario (figure 5) considers how different groups negotiate their use of shared public space. City authorities have bought in technological services with the objective of increasing the tourist economy. Citizens are encouraged by tax incentives to avoid the better micro places in the historic city centre – the shady bench, the pretty street - at the busy times of the day, leaving them free for tourists to enjoy.

Figure 5 The 'Coordination of Urban Busy Areas'

This fiction considers how top-down optimisations may prevent people from exercising free choice over their own city spaces.

These projects investigate how we would use technologies to make a space a place. How will technologies adjust movement and exchanges and how are these influenced by the relationships of space and place?

THEME: DATA

BIG DATA

A series of fictions were created to explore the growing trends of Big Data, the Quantified Self and the Internet of Things. These fictions raised issues such as: Where does this Big Data reside and who gets to see it, let alone make sense of it and use it? What tools might be needed to explore the space between and beyond buildings as citizens seek to understand the urban environment through interaction rather than delineation? The projects ask questions about what the toolkits of "data hunters" might contain, and how will they could mine the data sediments between and beyond buildings as they seek to understand the urban environment through interaction. One such toolkit is the Subjective Open Data API, covering an emotional compass that can control access into urban space. (figure 6)
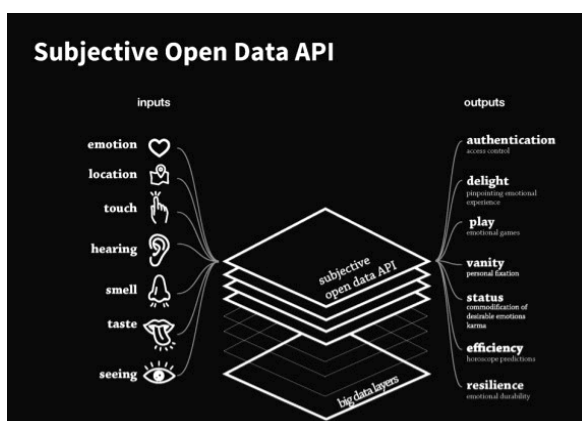

Figure 6. Description of Subjective Open Data API

The design fictions raised questions about what might happen to the people among all this quantifiable data that will be collected and processed in order to maximise the efficiency of the city? Will this human element of the smart city fall through the cracks in the built environment during the digital age?

HUMANSIDE

These fictions explore a near future where a city's lived-in urban spaces have transformed into information streams. The works question the increasing discrepancy between the data the system is capturing, and the data that is interpreted, and they explore how the essential human characteristics of emotions, knowledge and wisdom might be manifest in the smart city. An example is the 'Aural Fixation' story, (figure 7) where privacy amongst residents is maintained through the rare art of conversation. This analogue form of data cannot be detected or processed by the smart city's digital sensors. Friends and families share their personal thoughts within the closed walls of intimate spaces – their own home, a friend's living room, a favourite bar. But by using special hacked devices, new city voyeurs roam the streets peering into the windows of these intimate spaces hoping to catch glimpses of these secret stories.
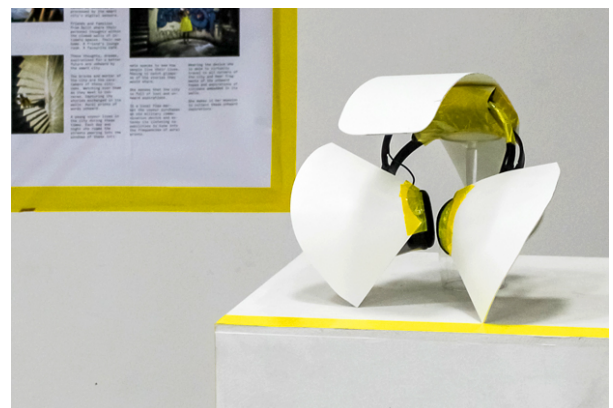

Figure 7. Interactive artefact from Aural Fixation, part of the Humanside series

FUTURE

THE HYBRID CITIZEN

How does the city look through the eyes of technologically augmented people who live in the Hybrid City - Hybrid Citizens? These projects investigate how we would use technologies to make a space a place. How will technologies adjust movement and exchanges and how are these influenced by the relationships of space and place? In the fiction titled 'The Price of Memories', a marketplace for memories has been established, where memories can be bought and implanted into your brain. A person who has more memories and is more experienced has a higher value. As anyone can sell their own memories by uploading them to the marketplace, users are finding ways to sell

more. The world is changing at a much faster pace for the sake of supporting the market growth. Likewise, creating a memory of something, and destroying it to prevent anyone else after you from creating a similar memory, will keep your market price higher. This is creating a new dynamic in the physicality of the world.

NEW ECONOMIES

In Aurora, there is a new Aura economy where even memory can be shared. In the beginning, the sharing economy in this megacity enabled encounter, trust and social capital (figure 8). But desire for efficiency and optimization lead to the development of highly sophisticated sharing systems that precluded social interactions. As time passed by the streets were empty, people lost agency with the physical world and with others. Public funding was given to researchers working on interactive systems to foster social connectedness.

Figure 8. Technological Augmentation in the Hybrid City.

Wearing our new technologies, we have achieved ultimate connectivity: we enjoy augmented experiences as long as we synchronise our senses with others in proximity. Sharing visual data requires that people look in each other's eyes; sharing feelings can only occur if people actually touch. Even memories can be shared, but this data is only unlocked when two or more users reach certain levels of specific neuromodulators. Personal Aura points determine your aggregated reputation and whether others can trust you for sharing or not. In an Aura economy, finally, what you give is what you get.

DISCUSSION

This paper describes the experience of, and reflection on, the application of a critical design approach in the particular context of a multidisciplinary group engaged in the exploration of a future-oriented technological topic. Critical design and its close relatives speculative design, design fictions and adversarial design, have previously been discussed from the perspective of the

experienced practitioner creating for a public audience, for example by Dunne & Raby (2014). This paper addressed the question of whether this type of approach would be relevant and productive within a summer school setting, where the purpose was for collaborative exploration, and the consolidation of an early disciplinary network.

Through observing and discussing the approach with participants, and assessing post event feedback, it was apparent that critical design became framed as way of initiating and structuring dialogue - a process or way of thinking. The open-ended nature of critical design was beneficial in generating ideas.

FROM MAPPING TO METHOD

As a way of describing this emergent process, and as a move towards formalising this into a resource that could be useful for future workshop events, it is interesting to compare the approach to formal design process methodologies. For example, the UK Design Council's 'double diamond' design process model (Design Council 2005), which is divided into four distinct phases; discover, define, develop and deliver, can be used as a starting point for articulating the summer school experience. Critical design corresponds to the early, scoping and problem definition stages of this design model (discover and define). During the summer school it was here, in this phase of opening out and expansion, that exploration took place, ideas were examined and conceptual boundaries were defined. It is at this point that critical design's interest in the social and cultural, the provocative and the imaginary, provided a catalyst for redefining the design space under consideration.

Once this critique had been explored and mapped, design fiction was adopted as a method of expressing these concepts in the form of fictional narratives; corresponding to the 'develop' and 'deliver' phases of the double diamond model. The end result was a collection of stories or scenarios that encapsulated the earlier discussions. These were presented in a form that was legible to others, such as video, text or interactive medium, was supported by physical props and prototypes.

CONCLUSION

Adopting a critical design approach in the summer school was a risk. But its focus on the description of possible futures made it a natural fit for the speculative nature of the summer schools' exploration of the creation and consumption of data in the future hybrid city.

The combination of the participants' skill sets, coupled with the necessary time constraints of the summer school, provided a unique setting in which to apply critical design. The outcome was that the approach was deemed successful, the unconstrained nature of critical design provided a context where participants could both explore the bounds of their individual disciplines, and

also discover connections with others, and thus negotiate a future critical discourse. However, this was a 'double edged sword' and led to the production of a wide range of initial concepts and ideas that would prove challenging to articulate in the final prototypes. Design fictions provided the means for the participants to weave complex ideas into fictionalized visions of the future city.

The result was fifteen design fictions, each exploring a different aspect of our possible relationships with city-based data in the future. The quality of the fictions was high and many connected with the essential human characteristics that comprise cities. In short, critical design created the setting for dialogue, which was instantiated through design fictions.

The output from the summer school has had a longevity that continues to reach beyond those eight days in Split. The online documentation and videos from the fifteen design fictions that were created continue to receive views, and the works have been further developed and form part of the City | Data | Future exhibition which has been shown in Croatia, Italy and Denmark and is scheduled to be exhibited in Austria, Slovenia and the UK in 2015.

More critically the shared experience of working in multidisciplinary teams over the course of the summer school has created something more than a network, it has resulted in a community of researchers who continue to collaborate and shape the nascent field of Urban Interaction Design.

REFERENCES

Auger, J. (2013) Speculative design: crafting the speculation, Digital Creativity, Vol 24, Issue 1, 11-35.

Bleeker, J. (2012) High-Tech crap you might find at the corner store of tomorrow, The Atlantic, http://www.theatlantic.com/technology/archive/2012/03/the-high-tech-crap-you-might-find-at-the-corner-store-of-tomorrow/254784/

Bleeker, J. and Nova, N. (2009) A synchronicity: Design Fictions for Asynchronous Urban Computing, The Architectural League of New York http://www.situatedtechnologies.net

Bohrer, S., Zielke, T. and Freiburg, V. 1995, 'Integrated obstacle detection framework for intelligent cruise control on motorways', IEEE Intelligent Vehicles Symposium, Detroit, MI Piscataway, pp.276-281

Cogdell, C. (2009) Design and the Elastic Mind, Museum of Modern Art (Spring 2008). Design Issues, Volume:25, Issue: 3, pp 92-101

Cross, N. (1996) Creativity in Design: not leaping but bridging, Proceedings of the Second International Symposium of Creativity and Cognition, LUTCHI, Loughborough University, UK.

The Design Council (UK), The Double Diamond model, http://www.thecreativeindustries.co.uk/uk-creative-overview/news-and-views/view-what-is-design-and-why-it-matters

DiSalvo, C. (2012) Adversarial Design (Design Thinking, Design Theory) MIT Press.

Dorst, K. (2003) But is it art? Understanding Design: 150 Reflections on being a designer, Amsterdam BIS Publishing.

Dunne, A. & Raby, F. (2009) What If … Science Gallery, Dublin. http://www.sciencegallery.com/whatif

Dunne, A. & Raby, F. (2011) What If …. http://www.dunneandraby.co.uk/content/bydandr/496/0

Dunne, A. & Raby, F. (2014) Speculative Everything: Design, Ficton & Social Dreaming, MIT Press.

Fischer, G., Lemke, A. C., Mastaglio, T. & Morch, A. I. (1991) The Role of Critiquing in Cooperative Problem Solving, ACM Transactions on Information Systems, Vol 9, No 3, 123-151.

Forty, A. (1986) Objects of Desire: Design and Society Since 1750, Thames & Hudson Ltd.

Helgason, I., Jensen, L., Rosenbak, S., Skrinjar, L., Smyth, M., Streinzer, A., Surawska, O., Wouters, N. (2013). From Urban Space to Future Place. UrbanIxD .

Kršić, D. (2014)"Design has always been a signifying practice", interview, "Design borderline", Golub Marko (ed), Dan D festival newspaper, Croatian designers society, Zagreb, (20-26)

Koskinen, I., Zimmerman, J., Binder, T., Redström, J., & Wensveen, S. 2011. Design research through practice: From the lab, field, and showroom. Amsterdam: Elsevier.Kršić, Dejan. "Design has always been a signifyin practice", interview, "Design borderline", Golub Marko (ed), Dan D festival newspapper, Croatian designers society, Zagreb, 2014. (20-26)

Mitrović, I., Smyth, M. & Helgason, I. (2014) city | data | future – Interactions in Hybrid Urban Space: The UrbanIxD Exhibition, catalogue. www.urbanixd.eu

Pallasmaa, J. (2009) The Thinking Hand, Existential and Embodied Wisdom in Architecture. John Wiley & Sons. UK.

Rittel, H. W. & Webber, M. M. (1972) Dilemmas in a general theory of planning, Working Paper No 194, Institute of Urban and Regional Development, University of California: Berkley

Rodgers, P. & Smyth, M. (eds) (2010) Digital Blur – Creative Practice at the Boundaries of Architecture, Design and Art, Libri Publishing, UK.

Schön, D. A. (1983) The Reflective Practitioner: How professionals think in action. Basic Books, NY. Simon, H. A. (1973) The structure of ill-defined problems Artificial Intelligence, Vol 4, 181-200.

Sterling, B, (2012) in "Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction" interview by Torie Bosch, The Slate. http://www.slate.com/blogs/future_tense/2012/03/0 2/bruce_sterling_on_design_fictions_.html

UrbanIxD Project (2014) www.urbanixd.eu