

Inflection Point

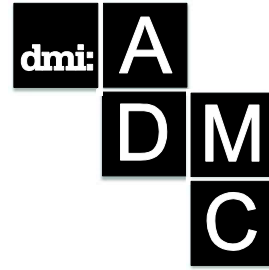
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Towards a Theory of Produced Design Space

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While partnerships between academia and industry are recognised as potential mechanisms for improved sector agility and competitive advantage, engagement in collaborative activity can be challenging. The translation of ideological paradigms and the application of practices inherent within each discipline can hinder the creation of new knowledge. However, it is recognised that collaboration in this context is increasingly important to both industry, for economic value, and academia for impact outside research.

This paper introduces produced design space as a situated context within collaborative activity and as being critical to open innovation practices, bringing together juxtaposed partners to co-create in a reciprocal and meaningful way. Produced design space is articulated as space that is enabled, created and facilitated to encourage collaboration between multidisciplinary partners, as opposed to the space of traditionally collaboration.

This study first introduces the spatial triad of Lefebvre: physical, mental and lived, applying his theoretical framework in order to explore the current understanding of produced design space from both a theoretical and practice based context, supported by evidence gathered during a series of multidisciplinary collaborative design workshops illustrating the theoretical considerations in practice.

Keywords: *Design; Space; Collaboration; Multi-Disciplinary*

Introduction

Synergies between academia and industry are increasingly linked to potential impacts such as improved sector agility; enhanced competitive advantage and improved market sustainability. However, it is recognized that engagement in collaborative activity can be challenging, for all involved. The translation of ideological paradigms and the application of practices inherent within each discipline can hinder the creation of new knowledge. Despite this challenge, it is recognised that collaboration in this context is increasingly important to industry, in terms of economic value and market security, and academia with regards to impact outside the traditional academic research domain.

Across industry, businesses are increasingly being driven towards new innovation practices, new models of delivery and new ways of working. Critical to this is the need to capture and capitalise on the internal assets of the organization, the skills and knowledge that exist within the workforce. Increasingly businesses recognize that the traditional research and development (R&D) model, that of an internal R&D department does not adequately meet the needs of a fast-moving, technology-driven marketplace. To this end, businesses are looking towards the acquisition of external knowledge in order to encourage sustainability and growth, looking outside the workplace for the skillset and experiences identified as required (Nowacki & Bachnik, 2015; Andriopoulos and Lewis, 2009). Further to this, the movement from a financial oriented economy towards that of the experience economy (Pine & Gilmore, 1999), and more recently a drive towards the concept of the knowledge economy, a development of Drucker's (1969) perspective of a 'knowledge society', highlight the trend and demand for innovative practices that enable businesses to succeed in an emerging global world.

Within the traditional R&D model described above, innovation was viewed as an inherently closed process (Chandler, 1977). This is typically illustrated as a linear model, with systematic and incremental change taking place over a longer period. However, in recent years this closed model has been challenged by a more disruptive, open innovation model, one that removes the traditional boundaries and creates a more distributed and engaged process of innovation. Open innovation began to recognise the user, or customer, as an intrinsic element, inextricably linked to the continued sustainability of the business and signified a shift in the

understanding of value (Bogers and West, 2012; Chesbrough, 2006, 2005, 2003; Sawhney and Prandelli, 2000; Von Hippel, 1976).

Despite a growing awareness of open innovation, many working practices are bound by tradition and the opposing of such deep-seated, linear innovation practices can be challenging. Schuurman et al, (2016) consider that despite the apparent shift to open innovation practices, most companies operate in a middle ground, stating that 'open versus closed is too simplistic' and furthermore that 'organisations and collaborations can differ in their degree of openness' (West et al, 2006; Bogers, 2011). Finding an 'open' and reciprocal middle ground is further challenged by the disciplinary differences that occur when considering collaboration between partners from multi-disciplinary contexts.

Therefore, an important element in the implementation of innovative practices is closer consideration of the dynamics of collaboration. This has been considered across the literature, including in the context of establishing and managing collaborative networks (D'Andreta et al, 2016) where collaboration between different types of actors shares and generates new knowledge in order to create value to reach solutions that might have otherwise been outwith the reach of individuals alone. However, there are gaps in the literature when considering the dynamics of collaboration within design led collaboration.

The increasing impetus on businesses to reinvent and remodel their working practices creates both opportunities and challenges for design. The value of user-centred and participatory design being recognized across a wider domain, design as a discipline is called upon to demystify its practice and process and is challenged to be articulate in illustrating the contribution of design to collaborative activity.

In recent years academic research has attempted to better articulate design terminology with the aim of reducing ambiguity as well as considering a more rigorous and valid application of design as a methodology. Derived from early descriptions of 'wicked problems' (Rittel & Webber, 1973), the literature is expanded by works from Buchanan (1992); Bucciarelli (1994); Cross (1997); Coyne (2005); Dorst (2006) and more recently with a focus on co-creation and participatory design practices (Sanders & Stappers, 2008; Koskinen et al, 2011).

There is also increasing interest in the notion of space. In his study of expansive design, van Amsterl (2015) recognizes that there are unexplored areas of space; both of the empirical and the abstract and that consideration

of these could provide valuable insights. Similarly, Cano-Kollmann et al, (2015) identifies the need to further explore the nature of 'the connections that span geographic, organizational and technological space' while further stating that 'increasing connectivity between knowledge clusters may yield new relationship forms that enable knowledge co-creation, rather than mere transfer'.

This paper attempts to further the discussion by introducing produced design space as a situated context within collaborative activity. Produced design space is articulated as space that is enabled, created and facilitated to encourage collaboration between multidisciplinary partners and is critical in combining the strengths of closed innovation practices with open, shared and collaborative innovation practices, bringing together juxtaposed partners to co-create in a reciprocal and meaningful way.

French philosopher Henri Lefebvre's works on the production of space (1991) is selected as a theoretical lens through which to consider design space. Lefebvre's theory is based upon the understanding that space is fundamental to our lived experience, to our interaction and understanding of the world. He contends that 'space is a social product, it is not simply 'there', a neutral container waiting to be filled, but is a dynamic, humanly constructed means of control and hence of domination, of power' (Lefebvre, 1991). This study first introduces the spatial triad of Lefebvre: the physical, mental and lived, before applying his theoretical framework to explore the current understanding of produced design space.

Explored through the experiences of participants engaged in a series of multidisciplinary collaborative design workshops, this paper will attempt to illustrate the theoretical considerations in practice with the aim of informing the knowledge and understanding of produced space. Further to the illustration of new insights, this paper contributes to the evolving nature of design theory and research and to the wider field of practice across multidisciplinary collaboration and open innovation practices.

Reframing Space

With regards to prominent scholars, critical theorists who have made recognized contributions to space include Gaston Bachelard, Henri Lefebvre, Michel de Certeau, Michel Foucault and Edward Soja.

Bachelard (1969) considered the meaning of spaces within poetry, exploring lived space and considering the embodiment of openness and

imagination. He contended that it is 'through imagination that we live space, a space which, in contrast to the void of abstract space, is full of possibilities'. Cultural theorist Michael de Certeau was concerned with the everyday practice of altering and adapting space (1984). He described space as a 'practiced place' and stated that space is 'composed of intersections of mobile elements'. Similarly, de Certeau described space as a social and was concerned with meaning and the way space can connect people to particular places, making them concrete and real.

Michel Foucault's work focused on spatial theories (1984) and considered the ways in which spaces is at once, real and imagined. His work on heterotopias defines situated spaces that are lived, embedded in aspects and stages of our lives. He stated that these spaces can at once mirror and distort, unsettle or invert other spaces. Urban planner, Edward Soja is most recognisable for his work on cultural theory and social geography (1996). Soja was heavily influenced by the work of Lefebvre and his spatial theory, 'thirdspace' employs a similar triad of space, concerned with spatiality, sociality and history.

More recently, scholars have attempted to consider a more contemporary response to space. Massey (2013) challenges the assumptions around space from a philosophical perspective while discipline specific considerations of space continue to expand the academic literature (Englestrom, 2003).

Harrison & Dourish (1996) consider the space of collaborative virtual environments and the role of technology, remarking that space can be considered as structural and physical elements, for example movement, constraint and interaction, while place can be considered as the way in which spaces generate their social meaning; 'space is the opportunity; place is the (understood) reality'. With regards to innovation, the impact of space on innovation teams has been considered from disciplinary perspectives and Barbara et al, (2014) writes that 'space is definitely dynamic' and considers the constantly evolving and re-shaping, re-invention and re-building of spaces inhabited in the modern city.

The space of participatory design is an evolving landscape. Examples of this include Hornecker et al, (2006) who consider the use of participatory design as a way of working within 'opportunity space', that is space that allows for the collation of user perspectives while Van Amsterl, in his work on expansive design (2015) describes how 'workshop participants acted as if space was the fundamental underpinning to the consumption, production, and distribution of knowledge'. Further to this, Heape (2007) refers to

design space as 'a fluid, dynamic, emergent and systemic whole of interweaving's, traced by trajectories of exploration, experiment and change'.

Lefebvre's Theory

Lefebvre's work has, since the 1960's been of influence to the discussion of space and his influence is noted in the work of those writing about space in recent years (Massey, 2013).

Central to Lefebvre's understanding is that we are 'confronted by an indefinite multitude of space, each one piled upon, or perhaps contained within, the next: geographical, economic, demographic, sociological, ecological, political, commercial, national, continental, global' (Lefebvre, 1991) and there is an ideological tendency to 'divide space up into parts and parcels in accordance with the social division of labour'. Because of the dominance of power within a capitalist society, it becomes challenging to view and experience the nuances of space that exist and therefore impossible to fully explore the interconnectivity and unity of the elements and the social relationships that bind spaces together.

To this end, Lefebvre proposes a spatial theory, with which he attempts to merge 'the various kinds of space and the modalities of their genesis together within a single theory'. The triad comprises of spatial practice (perceived space), representations of space (conceived space) and representational space (lived space). Central is Lefebvre's understanding that space does not exist as an entity, as a material reality. Rather space is produced, generated and created.

Spatial Practice – Perceived (physical) Space

Spatial Practice considers the framework of the outside world and the space within which the social relations of daily life take place, the perceived routines, networks and the resulting patterns of interaction. Shields (1999) describes this as 'logic and forms of knowledge, and the ideological content of codes, theories, and the conceptual depictions of space'. Often referred to as the observable and the concrete space, Zhang (2006) refers to this as the space of the physical movement of people and the flow of material, money and information. Petersen et al, (2013) describes this space as the physical practices and the routines of the everyday, ensuring continuity and a degree of cohesion while Merrifield (1993) refers to the impact of people's perceptions on their reality. Spatial practice is space that can be empirically

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mapped, for example a physical location or a building but extends beyond the physical objects or material places that we occupy to include our everyday routines (Shields, 1999).

Representations of Space – Conceived (mental) Space

Representations of space is what Lefebvre considered as the conceived space and can be understood as the space of 'mental construct' and 'imagined space' (Elden, 2001). This is also the space of knowledge and power, including the negotiation and struggle for power most commonly associated with architects, planners and government planners and the practices inherent in their disciplines. Referred to as the conceptualised space and the abstract, conceived is the space that is represented and planned, manifesting in maps, designs, institutional rules and symbols (Rutanen, 2014). This aspect of space 'always remains imagined; abstract in thought and is constructed through discourse' (Soja, 1996). Lefebvre (1991) states that representations of space are the most dominant form of space while Soja (1996) explains that representations of space have a role in the imposing of order and refers to the power of knowledge.

Representational Space – Lived (social) Space

Representational space is that of lived experiences, the imagination, the ideals, theory and vision, memory and responses of users and inhabitants. Referred to by Lefebvre as a 'subjective, bodily lived experience', this is the directly experienced social space. Intrinsically linked to the perceived and conceived, the lived encompasses all other spaces. Zhang (2006) refers to the 'dialectical relation' between the triad while Merrifield (2006) refers to this as directly lived space. According to Lefebvre, social space is a social product (Lefebvre, 1991) and it is within this space that meaning is generated, articulated and applied. Similarly, it is through this space that the objects of spatial practice generate meaning, becoming symbolic manifestations of lived space.

Table 1 Structure of Lefebvre’s Theoretical Triad

Spatial Practice	Representations of Space	Representational Space
Perceived	Conceived	Lived
Physical	Mental	Social
Daily reality, routine, space that can be mapped and identified, the observable and concrete	Where thought can become action, space of knowledge and power, home of urban planners and scientists	The subjective and lived experience, embodies all three elements of the triad

Interconnectivity Across the Triad

Core to Lefebvre’s concept is that the triad cannot be considered as individual, stand-alone elements. While each of the spaces retains its unique qualities, rather than being seen as separate entities they are multifaceted and interconnected, continually interacting through the creation of lived, the social space. With this in mind, it is important to consider how these interwoven spaces are made explicit. The interplay of the three dimensions creates the unity as understood by Lefebvre and space is produced by the dynamic interrelations between the elements of the triad, as illustrated in table 1.

Towards Produced Design Space

This paper introduces produced design space as a situated context within collaborative activity and as being critical to open innovation practices, bringing together juxtaposed partners to co-create in a reciprocal and meaningful way. Produced design space is articulated as space that is enabled, created and facilitated to encourage collaboration between multidisciplinary partners, as opposed to the space of traditionally collaboration, one based upon long-term collaborative agreement.

The outcome of this qualitative study explores the notion of produced design space, seeking to consider the application of Lefebvre’s theory and the articulation of further research questions that arise.

The Setting

Four design-led events, called chiasma were selected for this study. Chiasma are two and a half day, residential knowledge exchange workshops

organised as part of large research project, Design in Action (DiA). The central aim of DiA is to explore the potential of design as a strategy for growth in Scotland and to generate new business ideas. Each chiasma had a central thematic focus, from which a call for engagement was created in order to attract multi-disciplinary participants.

Chiasma participants comprised of professionals from design, business and academia and in each activity were encouraged to cross the traditional disciplinary silos, forming multi-disciplinary teams of four to five people. On the final day, each team pitched their business idea to a panel and constructive feedback was offered. Teams had the option to work up their idea into a business proposal post-chiasma and submit an application for start up funding of up to £20,000.

Methodology

The study undertook a multi-method approach across the four designed events in order to capture and explore the experiences of the everyday within the chiasma context and included participatory journey mapping and qualitative interviews with thirty-five participants.

Participatory journey mapping was undertaken post-chiasma with each participant and was used as a method of reflection, asking participants to consider their personal experiences, perceptions and feelings during the chiasma process. Journey mapping as a methodology recognises the potential of visualising the actual experience, or journey, of a participant through a process or space by highlighting the various stages, or touch-points experienced and allowing the researcher to see and better understand individual experiences from the perspective of the participant (Stickdorn and Schneider, 2011).

Qualitative interviews were conducted with chiasma participants with the aim of exploring and their experiences. The interviews were semi-structured as focused around key themes: the chiasma experience; networks and collaboration and innovation and reflection. Further to these themes, the journey maps were also used as prompt for discussion and to generate further discussion around knowledge exchange and creation.

In total, thirty-five semi-structured qualitative interviews were conducted from a total participant number of 83 invited to interview. The sample comprised of thirteen business participants; thirteen design participants and nine academic participants. The interviews were conducted between September 2013 and May 2015, lasted an average of 80 minutes and were recorded and transcribed.

Data Analysis

All transcripts were thematically analysed, with considerations made to sense making and identifying linkages. This enabled the clustering of data, from which the themes began to emerge. These themes were triangulated using the data gathered from the journey maps to identify any outlying elements and to consolidate the interpretation. The emerging themes are the common touch-points identified by the three participant types.

Subsequently, the emerging themes were then considered using Lefebvre's triad as a theoretical lens. Each theme was considered under the headings of perceived, conceived and lived space and data coded accordingly.

Findings

Sixteen themes emerged during the initial analysis of journey map data and qualitative interviews. These were identified as common themes across the three disciplines engaged, business, design and academia.

These themes were then considered using the theoretical lens of Lefebvre, to further understand space within the context of multidisciplinary collaborative design. The application of Lefebvre's theory highlighted the perceived, conceived and lived nuances of space as experienced by participants during the chiasma events. This included identification of examples of divergence and convergence across collaborative design space, interconnectivity between disciplinary perspectives and experiences and the lived experiences of those engaged.

The results in figure 1 illustrate each of the identified themes alongside their spatial underpinning, as explored through Lefebvre's perceived, conceived or lived spaces.

Seven themes were identified as reflecting the three spaces: interaction; experience; transformation; practice; reflection; value and participation. These are now discussed in more detail with the intention of illustrating the spatial elements at play.

Interaction

Interaction emerged as a space early within the chiasma. Participants referred to the 'unfolding' of the chiasma and how interaction changed over the course of the event. The design led activities were participatory in nature and therefore demanded a high level of face-to-face interaction. For many participants, this was a new way of working and some stated that it

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was 'intense', 'full-on' and 'busy', especially among the business and academic participants. The design participants appeared to be more familiar with the methodology and intensity of the interaction. Interaction also encompassed the more challenging nuances of collaboration, referred to as conflict and negotiation, 'Interacting with so many people, in such a short space of time was challenging' (Business Participant).

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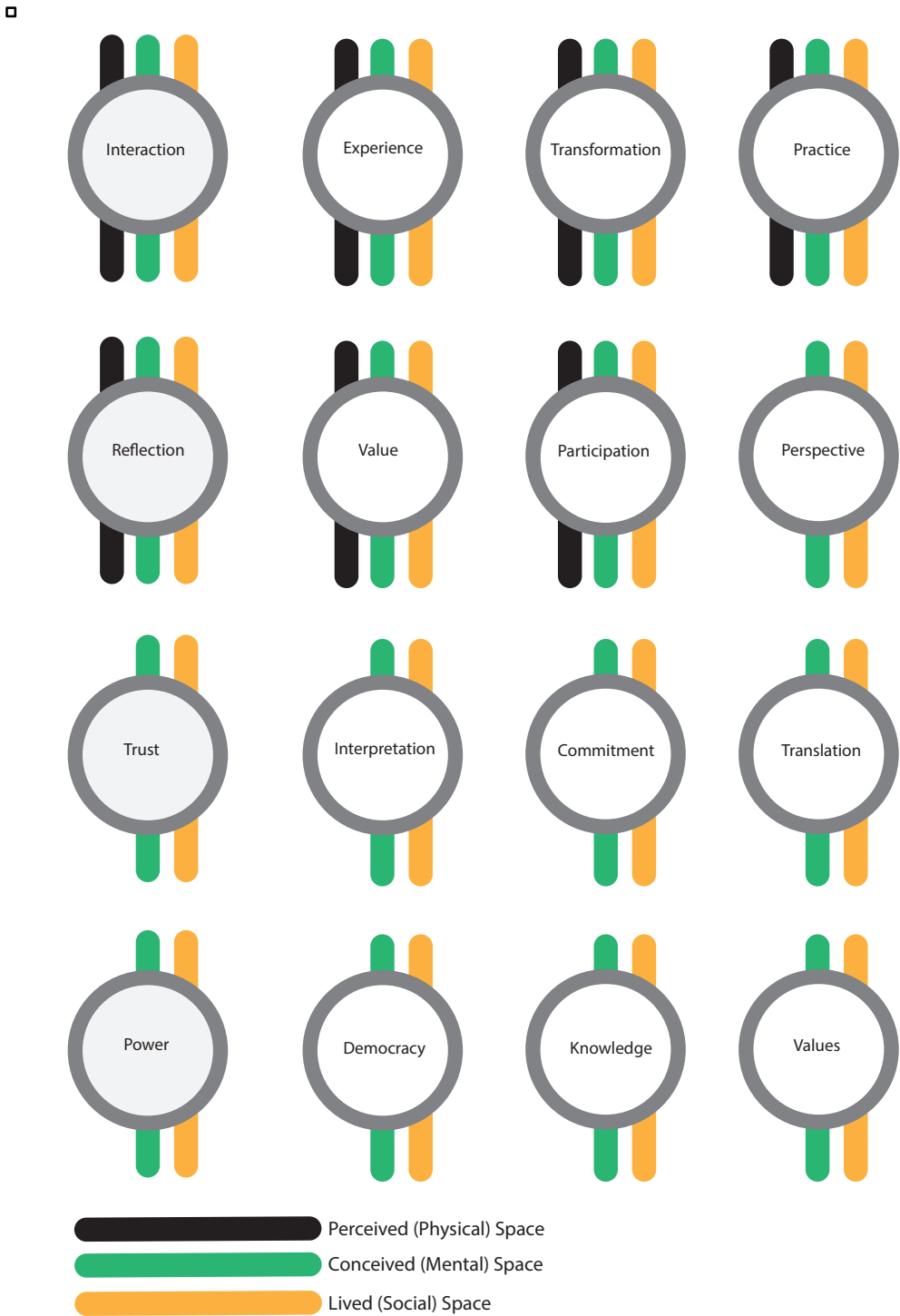


Figure 1 Illustrating the Spaces of Produced Design Space. Source: Hepburn, L. (2016).

The described unfolding of events can be considered as a perceived space of interaction. The programmed activities were fast-paced and included exercises designed to facilitate the conversational interaction required for relationship building. Referred to by a business participant as ‘a way of working through activities while getting to know the other participants’, this interaction space was perceived as ‘comfortable’ and ‘welcoming’, serving to put participants at ease. While this impact was felt across all participant groups, both business and academic participants identified this space as particularly important in ‘setting the scene’, with one business participant stating that the activity ‘forced me to say something early on, usually I’m quiet at the start but here I broke that seal early and once I get going, I’m fine’.

The conceptual space of interaction was identified throughout the chiasma. Participants played active roles at different points within the chiasma and the space where thought became action could be clearly observed. For business participant, this was linked predominantly to objects, both tangible and conceptual, that could demonstrate their skillset, such as ‘business plans’, ‘business models’ or ‘turnover figures’. These were used to symbolise the lived experience of the business participants and to produce meaning within the collaborative context. A similar understanding was observed in the design participants, who referred to their design skills; ‘I was very conscious that I wanted to use my skills to manage expectations, to show to the group that I was qualified’. The academic participants conceptualised interaction by referring to ‘papers’ written that situated their knowledge within an intellectual context.

The lived space of interaction was recognised as a critical element of the collaborative process. The chiasma placed participants at the core of the participatory design process and as active participants, each was encouraged to share their lived experiences in order to create rich insights. These insights created an open space for interaction that embodied the individual’s explicit and tacit knowledge and at the same time enabled sharing and building on this knowledge. For business participants this was referred to as a new environment, outside the traditional working context, ‘this was something completely new to me and I had to learn, or re-learn how to work with others’. Academic participants stated that they ‘worked as translators’ in the summarising and repurposing the interaction that took place within teams and this was also seen across design participants, who described it as ‘a way of speaking to people outside my profession, I had to be really clear about what I was trying to say’. In line with Lefebvre’s

thinking, the lived space of interaction within the chiasma is 'populated by users' and each brings an individual voice to a context that is constantly being changed by those who inhabit it.

Experience

Recognized as another critical space and one that generated a movement of power during the early stages of the chiasma, participants used their experiential knowledge as the asset with which to forge relationships and understanding.

Central to this perceived space was the recognition of everyday experience. Each participant arrived at the event representing their own profession and with that their embodied patterns and practices. A critical element of enabling collaboration within the chiasma context was the exploration of how each participant constructed their everyday life and how that experiences could be used within the chiasma. For business participants, this was seen in the need to define and make explicit their business acumen, in order to legitimise their attendance at the chiasma. One said 'I heard myself going on and on about my business, looking for respect in a way, and I actually had to stop myself sometimes'. Similarly, the design participants referred to the value of their design experience, noting that '...for some people, the whole idea of design was alien, completely new. But this is my bread and butter, I live design so I felt very confident in that space'. For academic participants however, the perceived space of experience was less about their academic qualifications or experience and more about their personal area of interest and potential for future research activity; 'It was hard trying to explain to people why I was there and what I could contribute. I just said that I'm curious'.

The conceived space of experience was linked to the recognised personal value of experience and how it can be applied within collaboration, most significant during the early stages of the chiasma. Each participant arrived with self-generated perceptions of self and of how their personal experience might be applied within the chiasma context. For the business participants, this was related to the norms of the profession, the 'business rules' and the exploration of how this expert knowledge might be applied. Similarly, the design participants referred to their expert knowledge, identifying their ease and familiarity with the design-led activities and using this to conceive an 'expert' persona within the groups. For the academic participants, the use of knowledge was central to how they self-positioned as figures of authority with regards to 'academic standing' and experience. While the use of the

conceived space in this context could be seen as an attempt at early dominance within the groups, it was predominantly unsuccessful due to the specialist nature of each discipline and the participatory nature of activities.

The lived space of experience focused on the sharing of experiential knowledge and the collaborative creation of new knowledge and new experiences. Participants attempted to validate their experiences by making them explicit within the social space, through conversations and interactions. By recognising their own competency, participants reported that they felt empowered, 'by being given the chance to tell my story, share my life experiences, I felt more confident being there. Like I had something to contribute and that other people might find my input useful (Business Participant)'. Further to this, participants reported that engaging in the design activities, and through interacting with the other disciplines, it was possible to build new experiences for future use; 'I've worked with other professions before but it's usually a stuffy, formal meeting. I wouldn't have thought to work with people in a hands-on way but we all learned so much from the experience. I'll try that again at my own place of work (Business Participant). However, the sharing and understanding of experience also proved challenging. A number of designers reported that they felt 'under-appreciated' or that design was 'not recognised as a valuable skill'. Towards the end of the chiasma this has shifted, with many reported that the perception of design had changed for the better; 'I do think people have a much better understanding of design now' (Design Participant). This was reiterated by an academic participant who stated that 'when I talked to some of the other academics afterwards, one of the key things we learned was about the role of design and how much potential it has.' (Academic Participant).

Practice

Practice within the chiasma referred predominantly to engagement and interaction with design tools and methods. Practice also referred to dissemination of know-how, of discipline specific knowledge 'we did share some of our working practices' (Business Participant), as well as the generation of new skills and knowledge.

The perceived space of practice included consideration of the physical interaction required for engaging with design tools and methodologies. Similarly, participants referred to the working practices of their everyday, how they collaborate in the 'real world' and the practices of engaging with other people. For designers, they talked about the 'process of designing' within the context of the client/designer relationships while business

participants referred to the practice of 'business', the theories and codes that bind that industry.

The conceived space of practice was characterised by the dominance of design. This was observed both conceptually, through the personal perception and responses of participants to design as a methodology as well as practically, through the positioning of the designer as the 'expert' in this context. Business and academic participants referred to the 'unease' they felt when initially engaging in design-led activities, "Some of the methods I think I could replicate but I might need an instruction manual" (Business Participant) however, as the event progressed participants became more confident and recognised potential value, "My repertoire has expanded, the things I do at work, I can now add design, or design thinking" (Academic Participant).

The lived space of practice can be identified in the meaning generated through engagement in the design-led activities. Each design method was used to enable participants to elicit and share insights, respond to ideas and generate new ways of working together. The ability to articulate meaning was essential in ensuring collaborative activity was reciprocal, open and most importantly, social. The participatory nature of design in this context enhanced the lived space for participants by creating an arena for engaged activity, '...each design activity forced us talk to each other' (Academic Participant).

Reflection

Participants reflected upon their past experiences of collaboration, both closed, internal to their own organization or institution and open, working with external collaborators. The perceived space of reflection in this context referred to these practices of everyday life, and the patterns that develop as people encounter it. Participants stated that they had fallen into a particular way of working and it was difficult to 'break the habit' or 'try something new'. For the business and academic participants, this was seen as the need to conform to the recognized representation of space within their discipline, 'We don't work like that, it would be too risky to take the time within my normal working day to just think wild ideas, it's all about time and money' (Business Participant).

Similarly, the academic participants reflected upon the perceived space of academia, the need to secure funding for employment and the pressure this creates; 'It's like a series of short-term contracts and sometimes you end up researching something that you're not that interested in, just

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because the funding is easier to get. It's just the way of academic life' (Academic Participant).

The designer's perceived space of reflection was understood as more formal, based around the working practices of the discipline and an understand that reflection is an integral part of the design process, 'reflection is what we do, it's what we're taught alongside the basics of form, tone and line. It becomes like a second nature, that we'll reflect on what we do' (Design Participant).

The conceived space of reflection referred to the representation and planning of activity, manifested in the programming of the chiasma. Inextricably linked to the theme of interaction, conceived reflection space is found not only within each activity and the subsequent discussion but also in the time of un-directed activity. Those moments of free time such as coffee breaks, during meals and in the evening where participants were encouraged to interact with each other; 'I found that I learned a lot more about my team members during the breaks, it was a chance to have a proper conversation away from all the designing' (Business Participant). The reflection space also created the opportunity for participants to construct their mental understanding of the events and consolidate their thinking; 'the activities were fast and the day was busy, I really appreciated the coffee breaks and found myself wandering along the corridors, just trying to process my thoughts' (Academic Participant).

The lived space of reflection combined the perceived and the conceived, creating a process that embodied the thinking that took place within the produced space and attempted to synthesis it. The intense nature of the event meant that participants had to actively make space for reflection and as such it became the space where meaning was generated and then applied in subsequent activities.

Transformation

Transformation, both professionally and personally was a reoccurring theme within the chiasma experience. The perceived transformation space was illustrated by the dismantling of complex, discipline specific practices and a move towards shared understanding within the multidisciplinary teams. Each discipline reported a shift from their existing working practices, from the daily routine; 'it was liberating to work outside the structure of my business' and the discipline domain; 'I always thought of designers as illustrators, like logo design and making things pretty, not in the broad sense that we have explored design [in the chiasma]'. Furthermore the shift was recognized specifically to the innovation process; 'it's difficult trying to come

up with new ideas on my own and I was always worried about people stealing my plans if I shared them, but actually what happens is that people usually have something interesting, and helpful to say’.

Similarly, the conceived transformation space can be linked to the personal transformation and development of participants, through engagement in the chiasma experience. This was highlighted by renewed interest and increased enthusiasm for collaboration as well as a broader understanding of the potential of design, ‘I’ve got so many more ideas, I’m excited again. It’s like the feeling you have when you start a new business, that kind of excitement and enthusiasm’ (Business Participant) and ‘It’s like wearing different glasses, I’m thinking about things in a whole new way, a way I never knew about before’. (Academic Participant).

The lived space of transformation was seen one that embodied skills and the social transformation that occurred during the design process. Participants highlighted the realization of exploring existing knowledge in new contexts. ‘my design skills were so limited, or I thought they were. But when we did the activities, I realized that my skills are much broader than I thought. (Design Participant), and the increased awareness of potential created through transformation ‘we all had skills to contribute but at the start it just felt that mine weren’t as visible you know. By the end of the chiasma though, I could see how transferrable all my skills and knowledge are’ (Business Participant).

Value

The articulation and awareness of value was an emerging theme and while common among participants, there were also interesting disciplinary differences.

The perceived space of value was closely linked to the understanding of a tangible output and the movement through the chiasma process. The focus for business participants was predominantly the financial incentive of seed funding, ‘I really wanted to secure the funding for my idea’ as well as recognizing a sense of accomplishment in presenting a feasible and business ready idea, ‘from a business perspective, and that’s the lens I use every day, I could see the holes in people’s business plans and felt proud that my team’s idea was much more realistic’. The perceived space of value for the design participants was less about financial gain and more about a display of skills and the opportunity showcase experience, ‘this was about design, and design is my thing. I wanted to share my passion with more people’. For academic participants, this space was a combination of both the financial

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potential, 'as academics, we're always chasing the next pot of funding' and the ability to tap into new networks, 'It was important to me to expand my network, to branch out in new directions and meet new people'.

The conceived space became most apparent when participants discussed the understanding of value. The differences around the meaning of value created hierarchical struggles between participants, 'I just couldn't see the point of some of the ideas, where was the value?' (Design Participant) and these could only be resolved once a collaborative definition for value had been agreed across the disciplines. This evolving dynamic of value shifted the balance of power between participants during different design-led activities and was made explicit in the final stages of idea development.

Finally, the lived space was most visible in the context of social value. This was referred to as 'networking', 'new relationships', 'connections' and 'friendships' emerging from the chiasma context. Participants from the three disciplines recognized the value of these interactions, both within the space of the chiasma itself, 'it was refreshing to talk to people who had completely different and new perspectives, about what they do and about what I do' (Academic Participant) and the potential value going beyond the event, 'I left with a sense of renewal and excitement, from the group of people I really bonded with and we're coaching each other to do well' (Business Participant).

Discussion

Beyond the physical

While the perceived space was referred to most explicitly as 'space' during discussions with participants, it was ultimately understood to be of less importance than the conceived and lived elements of the triad when considered using Lefebvre's lens.

Similarly, it was interesting to note that the physical elements and design activities within the perceived space did not create value within themselves. It wasn't until the conceived and lived spaces are considered that the physical manifestations have meaning. The act of interaction during a design activity was a critical element. The proximity and sharing of design resources (paper, craft items) as well as the physical task of moving and grouping other participant's post-it notes facilitated sharing not necessarily captured in written form and the value of such activity was not fully realized without the mental and social considerations.

The chiasma did move towards the embodiment of an everyday perceived space. Participants began to relax into the design activities over time, through understood expectations and familiarity. To this end, the design-led programme of the produced space takes on special meaning for participants and the processes within the space as well as the produced space itself can be understood as patterns of interaction.

More than a space of mind

The chiasma created meaning within the conceived space, simulating the physical or real world through the development of feasible business ideas as well as creating an embodiment of the imagined world, opening up participants to design methodologies as a way of capturing insight. The articulation of the imagination and the representation of this in the physical was challenging and was where participants relied on the design tools to navigate and represent their ideas. The role of knowledge, both individual and collective was linked to the knowing learned through experience of and engagement in the design processes and activities of the chiasma. This experiential element, including the negotiation of power between members was critical to the process of collaboration.

Living values

The role of the social, both as the overarching element of Lefebvre's triad and as a stand-alone space cannot be underestimated. The knowledge shared and generated, the articulation of that knowledge as an asset and the recognition of its potential was significant to the collaborative process. Within the chiasma context, the social network was seen as vital in enabling innovation practices and the role of behaviors from across the perceived and conceived spaces contribute considerably. It was clear that the experiences of each participant were both personal and professional responses to the context and the space within which they were engaged and the transformation of this towards a collective, social experience was critical to the collaboration.

Concluding Thoughts

The nature of the chiasma as a produced space was of one created as an encounter where participants have heightened experiences of collaboration. The produced space creates an environment in which participants can interact, experience, transform, practice, reflect, participate and generate

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value. It is apparent that produced design space should be viewed not as individual elements but as a cohesive, holistic space that while combining the physical and the mental, is inherently a social space. Produced design space in this context is therefore the result of embodied action and lived experience; it is inherently social while balancing the nuances of the perceived and conceived.

While this paper does not provide a practical solution or checklist for successful collaboration, it does provide considerations for produced design space which may be useful for participants, across disciplinary boundaries. This study is limited to an overview of produced design space within the context of chiasma and does not consider the types of design or knowledge co-creation activities undertaken within produced design space in detail. Further research is needed to provide insights about the application of produced design space as a conceptual model as well as the specific impact of design within produced design space. Thus, research questions to be addressed include further: application of the theoretical considerations of produced design space in new contexts; the role of design within produced design space and knowledge co-creation within produced design space.

References

Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science*, 20(4), 696-717.

- Bachelard, G. (1969). *The Poetics of Space*, trans. *Maria Jolas 1958*, 127.
- Barbara, A. (2014). *Forms of Space and Time*. In Yalvich, S. & Adams, B. [Eds.]. *Design as Future-Making*. Bloomsbury: London.
- Bogers, M. (2011). The open innovation paradox: knowledge sharing and protection in R&D collaborations. *European Journal of Innovation Management*, 14(1), 93-117.
- Bogers, M., & West, J. (2012). Managing distributed innovation: strategic utilization of open and user innovation. *Creativity and innovation management*, 21(1), 61-75.
- Bucciarelli, L. L. (1994). *Designing engineers*. MIT press.
- Buchanan, R. (1992). Wicked problems in design thinking. *Design issues*, 8(2), 5-21.
- Cano-Kollmann, M., Cantwell, J., Hannigan, T. J., Mudambi, R., & Song, J. (2016). Knowledge connectivity: An agenda for innovation research in international business. *Journal of International Business Studies*, 47(3), 255-262.
- Chandler, A.D., 1977, *The visible hand* (Belknap Press, Cambridge, MA.
- Chesbrough, H. W. (2006). The era of open innovation. *Managing innovation and change*, 127(3), 34-41.
- Chesbrough, H. (2005). Toward a science of services. *Harvard Business Review*, 83(2), 16-17.
- Chesbrough, H. (2003). The logic of open innovation: managing intellectual property. *California Management Review*, 45(3), 33-58.
- Coyne, R. (2005). Wicked problems revisited. *Design studies*, 26(1), 5-17.
- Cross, N. (1997). Descriptive models of creative design: application to an example. *Design Studies*, 18(4), 427-440.
- D'Andreta, D., Marabelli, M., Newell, S., Scarbrough, H., & Swan, J. (2016). Dominant cognitive frames and the innovative power of social networks. *Organization Studies*, 0170840615613374.
- De Certeau, M. (1998). *The Practice of Everyday Life: Living and cooking. Volume 2* (Vol. 2). U of Minnesota Press.
- Dorst, K. (2006). Design problems and design paradoxes. *Design issues*, 22(3), 4-17.
- Drucker, P. F. (1969). *Management's new role*. Harvard University. Graduate school of business administration.
- Elden, S. (2001). Politics, Philosophy, Geography: Henri Lefebvre in Recent Anglo-American Scholarship. *Antipode*, 33(5), 809-825.

- Engeström, Y., Puonti, A., & Seppänen, L. (2003). Spatial and temporal expansion of the object as a challenge for reorganizing work. *Knowing in organizations: A practice-based approach*, 151-186.
- Foucault, M. (1984). Space, knowledge and power. *The Foucault Reader*, 239, 256.
- Hannigan, T. J., Cano-Kollmann, M., & Mudambi, R. (2015). Thriving innovation amidst manufacturing decline: the Detroit auto cluster and the resilience of local knowledge production. *Industrial and Corporate Change*, 24(3), 613-634.
- Harrison, S., & Dourish, P. (1996, November). Re-place-ing space: the roles of place and space in collaborative systems. In *Proceedings of the 1996 ACM conference on Computer supported cooperative work*, 67-76, ACM.
- Heape, C. (2007). The Design Space.
- Hornecker, E., & Buur, J. (2006, April). Getting a grip on tangible interaction: a framework on physical space and social interaction. In *Proceedings of the SIGCHI conference on Human Factors in computing systems*, 437-446, ACM.
- Koskinen, I., Zimmerman, J., Binder, T., Redstrom, J., & Wensveen, S. (2011). *Design research through practice: From the lab, field, and showroom*. Elsevier.
- Lefebvre, H. (1991). *The production of space* (Vol. 142). Blackwell: Oxford.
- Massey, D. (2013). *Space, place and gender*. John Wiley & Sons.
- Merrifield, A. (1993). Place and space: a Lefebvrian reconciliation. *Transactions of the institute of British geographers*, 516-531.
- Nowacki, R., & Bachnik, K. (2015). Innovations within knowledge management. *Journal of Business Research*.
- Pine, B. J., & Gilmore, J. H. (1999). *The experience economy: work is theatre & every business a stage*. Harvard Business Press.
- Petersen, M., & Minnery, J. (2013). Understanding daily life of older people in a residential complex: the contribution of Lefebvre's social space. *Housing Studies*, 28(6), 822-844.
- Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155-169.
- Rutanen, N. (2014). Lived spaces in a toddler group: application of Lefebvre's spatial triad. In *Lived Spaces of Infant-Toddler Education and Care* (pp. 17-28). Springer Netherlands.
- Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18.

- Sawhney, M., & Prandelli, E. (2000). Communities of creation: managing distributed innovation in turbulent markets. *California management review*, 42(4), 24-54.
- Schuurman, D., De Marez, L., & Ballon, P. (2016). The Impact of Living Lab Methodology on Open Innovation Contributions and Outcomes. *Technology Innovation Management Review*, 1(6).
- Shields, R. (1999). *Lefebvre, love, and struggle: Spatial dialectics*. Psychology Press.
- Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and other real-and-imagined places* (p. 53). Oxford: Blackwell.
- Stickdorn, M. & Schneider, J. (2011). *This is Service Design Thinking: Basics, Tools, Cases*. Hoboken, NJ: Wiley.
- Von Hippel, E. (1976). The dominant role of users in the scientific instrument innovation process. *Research policy*, 5(3), 212-239.
- West, J., Vanhaverbeke, W., Chesbrough, H., (2006). Open innovation: a research agenda. In: Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *Open Innovation: Researching a New Paradigm*. Oxford University Press, NY.
- Zhang, Z. (2006). What is lived space. *ephemera*, 219.