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Abstract

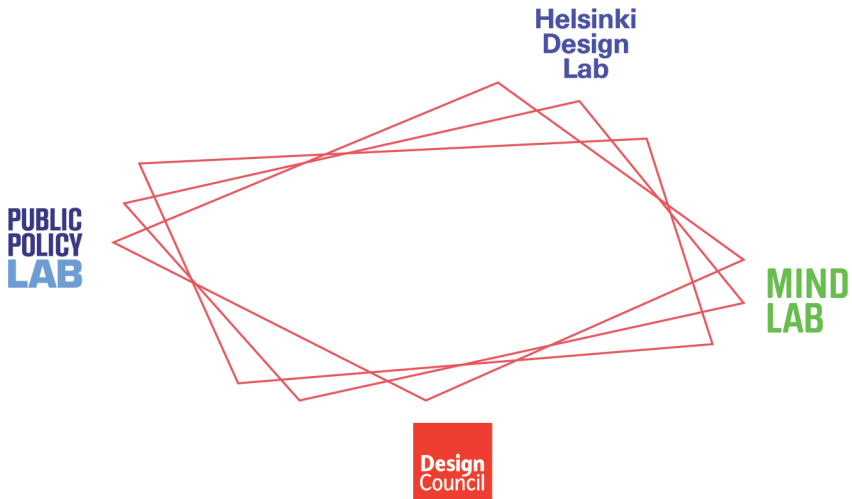
This master’s thesis investigates the notion of design depicted by the design-led labs (DLLs) in the emergent field of design for public sector through the viewpoints of two eminent design scholars, namely Bryan Lawson and Nigel Cross.

The DLLs in this thesis refer to various agencies with design as their core competence that are involved in the attempts to improve public service provision and policymaking in collaboration with their respective governments. These DLLs have largely owed their origins to the governments’ demands for creating better services and policies with decreased financial resources. As a result of budgetary constraints and a variety of complex societal problems, the public sectors has been obligated to seek ways to innovate their solutions. In the effort to mitigate the difficulties, design seems to have arisen as one of the alternative approaches to address these challenges on account of its prevalent emergence and achievements around the world. However, the usage of the term “design”, constantly mentioned by the DLLs appears confusing and remains undefined. Due to this lack of clarity with the most essential concept, this thesis attempts to disclose the actual meaning of “design” as seen by the DLLs.

This thesis analyses the notion of design adopted by DLLs and explicated in their reports. The notion of design is operationalised on the basis of four landmark design research publications. These serve as investigate lenses in examining the reports from DLLs in four different countries, namely the Design Council (UK), Public Policy Lab (US), Strategic Design Unit at SITRA (Finland), also known as Helsinki Design Lab, and MindLab (Denmark), in order to identify the various notions of design. Through the analysis of the four books, the notions of design are identified and categorised under three themes: *design tendencies*; *design capabilities*; *design skills*. The analysis based on the aforementioned themes shows that the notions of design expressed in the DLL’s reports extend or contradict those established by Lawson and Cross.

As a conclusion, this study presents the four extended design capability and design skills, as well as *a new set of design capabilities* that may contribute to the process of expanding the notions of design adapted for the public sector in order to improve service provision and policymaking. Additionally, the thesis summarises the arguments presented by the DLLs in support of fostering design as a viable tool for the public sector and governments to achieve more effective service provision and policymaking.

Keywords design study, notions of design, definitions of design, design for public sector, design for government



WHAT DO THEY REALLY MEAN BY "DESIGN"?

A textual analysis of the reports from the design-led labs that strive for better public service provision and policymaking

Master's Degree Programme in Creative Sustainability
Aalto University School of Arts, Design & Architecture
FANG-YI LEE

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Master's Thesis

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Aalto University School of Arts, Design & Architecture

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" THIS CAPABILITY GREW FROM THE PRIVATE SECTOR, BUT PROVIDES VITAL CUES FOR THE PUBLIC SECTOR. IT IS THE CAPABILITY TO DO MORE FOR CITIZENS WITH LESS, OR DO LESS WITH GREATER EFFECT. IT HAS THE POTENTIAL TO MEET THE PRESSING NEEDS OF THE PRESENT, BUT ALSO TO HELP GOVERNMENTS ACHIEVE WIDER LONG-TERM AIMS OF GROWTH AND QUALITY OF LIFE FOR ITS CITIZENS. "

Rt Hon David Willets MP, Minister for Universities and Science,
Department for Business, Innovation and Skills, UK

PREFACE

On reflection of my previous career, I studied Industrial Design in my bachelor's degree and had practised as a product designer for a few years, back in Taiwan. As a junior designer, I have been wondering myself for years: *how can a designer contribute to society in addition to prettying things up aesthetically or creating something that did not exist before?* This question has become my motivation for further education. Fortunately, I was accepted into the Creative Sustainability master's programme at Aalto University and explored my profession with a fresh perspective.

During my master's studies, I noticed an increasing attention on the use of design within the public sector in Finland and elsewhere, beyond furniture in public spaces and architecture. The design-led labs immediately gained my interest and I began to pay attention to their projects and reports. While I was craving an opportunity to be involved in such work, I have frequently found myself unable to explain what the focus of my study is to my friends and family back home, and even worse, to the students in different design programmes at Aalto University.

Previously I subscribed to the view that, *it is service design for the public sector*. Some initiatives, however, clearly went further than that, towards policymaking and industry renewal. Take Low2No, the sustainable building design competition by the Strategic Design Unit of SITRA– the Finnish Innovation Fund that changed the national fire code, which in turn allows timber structure buildings to construct up to eight stories. This has a far-reaching impact as it exponentially grows the change for carbon sequestration from a single building in a specific location (in this case, Jätkäsaari) towards the whole industry and nation. This impacts what design means when it comes to improving public service and policymaking and has become a topic of discussion among my study colleagues ever since, and we have never arrived at a consensus.

I have realised that my master's thesis could be a perfect chance for me to learn, or at least, to explore what design means in this sphere. Given the limited time, I had to utilise a reductive approach in research design by taking two eminent scholars as my lens and analysing the reports from the design-led labs through it. I am confident, however, that I have learnt a great deal over the course, and feel much more comfortable to discuss with my family and friends what I mean by design when I explain what I would like to do as a designer. I sincerely hope the readers also feel the same way after reading this report.

ABSTRACT

This master's thesis investigates the notion of design depicted by the design-led labs (DLLs) in the emergent field of design for public sector through the viewpoints of two eminent design scholars, namely Bryan Lawson and Nigel Cross.

The DLLs in this thesis refer to various agencies with design as their core competence that are involved in the attempts to improve public service provision and policymaking in collaboration with their respective governments. These DLLs have largely owed their origins to the governments' demands for creating better services and policies with decreased financial resources. As a result of budgetary constraints and a variety of complex societal problems, the public sectors has been obligated to seek ways to innovate their solutions. In the effort to mitigate the difficulties, design seems to have arisen as one of the alternative approaches to address these challenges on account of its prevalent emergence and achievements around the world. However, the usage of the term "design", constantly mentioned by the DLLs appears confusing and remains undefined. Due to this lack of clarity with the most essential concept, this thesis attempts to disclose the actual meaning of "design" as seen by the DLLs.

This thesis analyses the notion of design adopted by DLLs and explicated in their reports. The notion of design is operationalised on the basis of four landmark design research publications. These serve as investigate lenses in examining the reports from DLLs in four different countries, namely the Design Council (UK), Public Policy Lab (US), Strategic Design Unit at SITRA (Finland), also known as Helsinki Design Lab, and MindLab (Denmark), in order to identify the various notions of design. Through the analysis of the four books, the notions of design are identified and categorised under three themes: design tendencies; design capabilities; design skills. The analysis based on the aforementioned themes shows that the notions of design expressed in the DLLs reports extend or contradict those established by Lawson and Cross.

As a conclusion, this study presents the four extended design capability and skills, as well as a new set of design capabilities that may contribute to the process of expanding the notions of design adapted for the public sector in order to improve service provision and policymaking. Additionally, the thesis summarises the arguments presented by the DLLs in support of fostering design as a viable tool for the public sector and governments to achieve more effective service provision and policymaking.

KEYWORDS

DESIGN STUDY, NOTIONS OF DESIGN, DEFINITIONS OF DESIGN, DESIGN FOR PUBLIC SECTOR, DESIGN FOR GOVERNMENT

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01

INTRODUCTION

1.1 BACKGROUND

Countries around the world are suffering from budgetary constraints. The demands for creating better services and policies within shrinking budgets have become resonant for virtually any government all over the world. Capturing the example of Finland, Aalto University was unprecedentedly forced to lay off 350 employees due to significant government funding cut by 2018. Similarly, the influence of prudent fiscal policy also can be seen in England, London Borough of Lambeth is forced to downsize the number of their staffs from 1,000 to 500, and reduce the expense for day-to-day service due to the new budget hit of the 2016/7.

Not only is the degree of budget cuts an issue, but also complex societal problems – with the latter reaching the topmost rankings in history. The rising societal issues are ranging broad and running deep. They consist of unemployment, immigration, healthcare, ageing population and other serious problems, which have been referred to as ‘wicked problems’ (Rittel & Webber 1973). As the most significant and primary service provider for supporting people’s everyday life, the public sector is therefore forced to seek a way to transform itself and to innovate solutions for the challenges they now confront. In other words, innovation is urgently required within governmental sectors.

In the effort to mitigate the above challenges, design appears to have become one of the alternative approaches and has increasingly gained attention in public sectors around the world. A number of new agencies have risen with design as their core competence in different forms: some were established and funded by the government as a governmental unit or an independent organisation while the others were independently initiated and privately funded or per projects, and the scale ranges from municipal to national. (For a fuller list, see Table 1).

At the municipal level, the design agencies have different names, such as the Kennisland of the Netherlands (1998–), Le 27e Région of France (2008–), The Australian Centre For Social Innovation (TACSI, 2009–), New York’s Public Policy Lab of the United States (2011–), the Design Driven City of Finland (2014–2015) etc. Kennisland is a think tank, non-governmental organisation and funded per project. Le 27e Région of France was initiated by French regional government as an experimental incubation and has

GOVERNMENT OWNED ORGANISATION	INDEPENDENT ORGANISATION (PUBLIC, GOVERNMENT FUNDED)	INDEPENDENT ORGANISATION (PRIVATE OR MULTIPLE SOURCES FUNDED)	
MindLab (DK), the Strategic Foresight and Design Unit at Government of Alberta (CA)	Strategic Design Unit of SITRA (Helsinki Design Lab) (FI)	The Design Council (UK)	NATIONAL LEVEL
The Design Driven City (FI)	Le 27e Région of France (FR), the Australian Centre For Social Innovation (AUS)	Kennisland (NL), the Public Policy Lab (NY)	MUNICIPAL LEVEL

Table 1 – Design-led labs categorised according to the operation scales and funding structures

become an independent association since 2011. Its’ financial sources are mainly supported by certain regional governments of France and European funding. Geoff Mulgan, the CEO of NESTA of the UK instigated the launch of TACSI as an independent not-for-profit organisation with funding from the South Australian Government. The Public Policy Lab also operates as a not-for-profit organisation with per-project funding, however with public endowments, mainly Double-R Foundation for general operating support. The Design Driven City was born as a legacy of World Design Capital Helsinki (2012) and funded by the city of Helsinki, Espoo and Kauniainen.

At the national level, the design agencies include the following: the Design Council of the UK (1944–), MindLab of Denmark (2002–), the Strategic Design Unit of SITRA, the Finnish Innovation Fund (often mistaken as Helsinki Design Lab, which was one of the initiatives of the unit) (2009–2013), the Strategic Foresight and Design Unit at Government of Alberta, Canada (2012–). The Design Council is an independent enterprising charity operating with governmental grants and paid-for services. MindLab was established by three Danish ministries and partnered with Odense municipality. Similarly, the Strategic Foresight and Design Unit at Government of Alberta is an inner innovation lab in Alberta government that cooperates with various ministries. SITRA, that funded the initiatives of its strategic design unit, has operated within the endowment from the Bank of Finland since 1967 and directly reports to the Finnish Parliament.

To refer to these types of public agencies with design as its core competence, I use the term design-led labs or DLLs hereafter.

As the aforementioned phenomenon becomes more and more prevalent, I myself have become highly interested in such work. Taiwan, where I am originally from, has also been severely suffering from inexhaustible wicked problems. Besides, plentiful policy and public services have become redundant or outdated that unable to satisfy people's demands. This is evident in the case of the overpriced housing situation in the capital city of Taiwan. Owing to relentlessly increasing housing price, the difficulty in achieving homeownership has run prevalence and vigorous among average citizens. Conventional housing solutions such as social housing, government financial aids are either insufficient or incompetent to tackle this issue anymore. The novel housing solutions are urgently expected; nevertheless, the bureaucracy involving different interest groups has resulted in the slow progress of generating adequate service and policy. As a result, the situation has become crucially demanding to explore an effective and efficient manner to deliver a public service and policy.

Fortunately, the Creative Sustainability master's programme in Aalto University offered a course called Design for Government which directly relates to the sort of work. During the course, we were exposed to the reports from the DLLs. There are numerous illustrations of how design was employed to define wicked problems and generate desirable outcomes in the reports. The term "design" has constantly been mentioned in their cases and raised my confusion about what do they mean by design.

Browsing an assortment of reports, every DLL seems to have their own opinions about what design is and what design does even though they all used the term "design" to entitle their practices. This would possibly indicate various subfields of design and thereby to arise some confusion about the actual meaning of design seen by the DLLs. The "design" they have maintained over time seems not yet well-defined. Moreover, some were stressing the approaches that are traditionally not considered as design competence. For example, MindLab indicates that a contemporary designer should be able to facilitate the process of designing together with the future users by utilising a set of design tools to engage diverse stakeholders in the design process (Bason 2013: 7). Therefore, a designer's role is not merely designing the final result but also acting as a facilitator at this point. Another new design competence is illustrated briefly by the Helsinki Design Lab; they highlights that the capability of stewardship is required for a strategic designer in order to ensure the plan convert into real action (Boyer et al. 2011: 48). These cases raised my interest to investigate further what are the other design elements have

been depicted by the DLLs. In short, although design is being fostered as a strategic impetus for improving policymaking and public service provision, the definition of "design" among DLLs is far from clear within this setting, and we need to understand the groundwork in order to claim further knowledge upon it.

A clear definition is essential to the development of specific knowledge because one discipline is unable to proceed with any further improvements if there is no common ground to build upon. The impact of design is unable to be evaluated when the definition of design presents unsettled (Cheng et al. 2012: 18). As a result, there is a necessity of defining this type of design, and this paper aims at establishing a set of common design features utilised among the DLLs when they work on the design in the public sector. This thesis attempts to identify those features recognised from the DLLs' reports by comparing them with two eminent design scholars' works. As a result, design students who aspire to work in the public sector may benefit by understanding the notion of design described by the DLLs that captured in this report. Also, researchers may derive preliminary comprehension of this emergent design, and further investigate the expanding notion of design in this development. Lastly, but not least, I hope that this modest report could clear some of the misunderstandings, and spark a constructive discussion about what we mean by this type of design among peers.

To summarise, public sectors around the world are currently exposed to tremendous transformative crises and challenges. In addition, severe budget cuts cause governments to no longer afford overwhelming expenses on the welfare systems. Governments are thus obligated to seek innovative approaches to create effective and efficient solutions. Design seems to be one of competent approach owing to the rising numbers of DLLs emergence. Together, these DLLs are established to assist their local or national government in delivering efficient services and policies that they claim to adopt design as their approach. However, the notion of design among DLLs appears too ambiguous. Skimming the DLLs' reports, they seem to emphasise different design elements in their practices. Due to this interesting phenomenon observed and my particular interest regarding the field of public design, I decided to initiate my master's thesis on this issue. In this thesis, the goal is to disclose the notion of design shared among the DLLs with the assistance of traditional design research literature and to propose what these DLLs mean by design adapted for the public sector as an approach to improve service provision and policymaking.

1.2 METHOD: RESEARCH DESIGN AND DATA

This master’s thesis explores the notion of design described by the design-led labs (DLLs) in the emergent field of design for the public sector. In order to do so, I first analysed the notions of design by two eminent scholars, namely Bryan Lawson and Nigel Cross, articulated in their four landmark books (see Table 2). Secondly, adopting Lawson and Cross as analytical lenses to explore the DLLs’ reports, the notions of design from the DLLs were analysed through literature. Together, I present how the themes indicated by the two scholars are extended or contradicted by the themes emerged in the reports of the DLLs. The aim is to reveal the similarities and discrepancies between the established notions of design and the emergent notions of design.

Given the limited time of a master’s thesis, it would be too ambitious to explore all the existing literature that attempts to define design (cf. Nichols & Dong 2012; Dunne & Martin 2006; Atwook, McCain & Williams 2002; Buchanan 1992; Schön 1983; Cross 1982). As Herbert A. Simon (1988: 67) famously notes: ‘everyone designs who devises courses of action aimed at changing existing situations into preferred ones’. Indeed, design has developed as many definitions as the various roots (such as architecture, craft, and engineering), many sub-disciplines (such as textile design, fashion design, graphic design, industrial design, or interaction design), and emergent ones that spans towards other fields (such as user-centred design, design management, or service design).

Lawson and Cross are two of the most cited scholars and thus are among the most influential researchers in the discipline of design. Arguably, their research enables this thesis to work effectively while covering a comprehensive scope as they come from fields of industrial design and architecture. Both researchers started to conduct investigations into how design is unique from other professions in the 1980s. Lawson published the book “How Designers Think: The Design Process Demystified” (1980) (Note: It is the fourth edition of the book that published in 2005, was studied in this thesis); meanwhile, Cross published a seminal journal article “Designerly Ways of Knowing” in 1982. Following that, a series of his articles and papers related to this theme were collected and published as the book “Designerly Ways of Knowing”(2006). These two scholars seem to agree with each other since they have largely cited each other’s study in their respective publications. An example of their consensus in design study can be easily recognised in the

book, “How Designers Think: The Design Process Demystified”, in which Lawson wrapped up his conclusion by reviewing one of Cross’ studies. The notion of design by Lawson and Cross, therefore, can be said to be relatively well-articulated and mutually agreed upon in their four books even though they come from quite different subfields of design. The books of Lawson and Cross that guide this thesis are:

AUTHOR	TITLE	YEAR	PAGES	PUBLISHER
Bryan Lawson	How designers think: the design process demystified	2005 (4th ed.) Note: The original version was published in 1980	321	Architectural Press
	What designers know	2004	127	Architectural Press
Nigel Cross	Designerly ways of knowing	2006	138	Springer-Verlag London Limited
	Design thinking	2011	163	Berg

Table 2 – The four landmark books of Lawson and Cross

I have also considered an alternative choice to take service design literature for the analytical lenses as many DLLs essentially endeavour to deliver better public services. However, not all the DLLs consider service design as the sole focus area (e.g. SITRA’s Strategic Design Unit touches upon law and policy as well as services). In addition, service design seems to be a rather young field of study in design, and I was not confident to make a comprehensive literature review of the developing field. Indeed, Design Studies, one of the most prestigious outlet for design research, has recently opened a call for the special issue on “Design Processes in Service Innovation” with the expected date of publication as mid-2017. In the brief of the call, the journal argues that ‘service design is still in a process of defining its own scope and of setting its boundaries’ (Secomandi & Snelders 2016).

Turning now to the criteria of selecting DLLs for this study, four DLLs have been selected for analysis. Although there are various innovative public agencies that work for, or cooperate with governments, the publications of the DLLs were chosen from two essential criteria: those that explicitly adopt the design approach and either is owned, funded by, or in partnership with a government. The Behavioural Insight Unit of the UK, for example, was excluded because they do not explicitly adopt design as their core competence. There were also some agencies that conform these criteria but were nevertheless excluded due to either lacking access to documentation, language barrier or other reasons. The Strategic Foresight and Design Unit at the Government of Alberta has not yet written any documentation public, Le 27e Région only offers its reports in French, and Kennisland published only few reports, and thus insufficient to be analysed.

Consequently, the final selection of the DLLs for analysis in this thesis consists of the Design Council from the UK, the Strategic Design Unit of SITRA from Finland, the Public Policy Lab from the US and MindLab from Denmark (For a fuller list of reports, see Table 3).

- **Design Council of the UK:** an independent enterprising charity that receives a grant from the Department for Business, Innovation and Skills (BIS)
- **Strategic Design Unit of SITRA, the Finnish Innovation Fund (also known as Helsinki Design Lab):** an experimental unit that stresses the necessity of strategic design
- **Public Policy Lab of the US:** a non-for-profit organisation supported by a private foundation and partner cooperating with the New York municipality
- **MindLab of Denmark:** a cross-ministerial innovative unit that focuses its effort on citizen engagement

The Internet is the main source of data. I have analysed publications, articles, and reports written by the respective DLLs. The complete body of data consists of 23 PDF file publications that include 1,252 pages, and 320,172 words in total.

DESIGN-LED LABS (DLLS)	YEARS	REPORTS	PAGES	WORDS
DESIGN COUNCIL (UK)	2004	HEALTH: co-creating services	57	12,259
	2008	Design Council briefing 2: The role of design in public service	4	2,331
	2013	Design For Public Good	95	23,585
	2013	The Knee High Project Report	49	23,372
	2015	Designing a better Britain_ Manifesto 2015	12	2,244
STRATEGIC DESIGN UNIT, SITRA (HELSINKI DESIGN LAB) (FI)	2011	In Studio: Recipes for Systemic Change	339	85,191
	2012	Creative Collaborations	31	4,377
	2012	From Shelter to Equity	31	6,557
	2012	Instrumental Design	23	5,030
	2012	Thinking Big By Starting Small	23	5,178
	2013	Legible Practises: Six Story about The Craft of Stewardship	142	33,993
PUBLIC POLICY LAB (US)	2013	Public & Collaborative: Design Services For Housing	80	29,415
	2013	Understanding NYC School Choice	92	9,016
	2014	Evaluating Housing Services	88	26,833
MINDLAB (DK)	2011	From Insight to Change	43	6,978
	2012	Leading Social Design: What does it take?	6	2,725
	2013	How Public Design	41	5,477
	2013	Co-production Towards A New Welfare Model	47	4,358
	2013	Discovering Co-production By Design	13	7,018
	-	MindLab's methodology described in their case study published on website	36	24,235
SUM			1,252	320,172

Table 3 – List of analysed reports



1.3 RESEARCH QUESTION AND ANALYSIS

In the attempt to understand what do the design-led labs (DLLs) actual mean by “design”, the following research questions guide my inquiry:

1. What are the established notions of design articulated by Lawson and Cross?
2. What are the emerging notions of design depicted in the DLLs’ reports?
3. How the DLLs’ reports (2) extend or contradict the established notions of design (1)?

Thematic analysis guides this research in recognising patterns, organising the body of data into a dataset with a detailed description (Braun & Clarke 2006: 79). The analytical process was inductive in clustering the themes from the books of Lawson and Cross in order to find common ground and discrepancies. At the beginning of the study, the books and reports were analysed by taking notes verbatim and staying close to the data. Then I utilised the coding and sorting process from grounded theory (Strauss & Glaser 1975), inductively retrieving a preliminary coding scheme, which enabled greater familiarisation with the content and overview of data.

I later conducted a second cycle coding (Saldaña 2009) by revisiting the data with the assistance of data management software, namely MAXQDA to facilitate the coding process with a clear visualisation and information management. This phase offered the chance to yield more direct quotes, giving this study a more comprehensive view on the analysis through a quote matrix (See Appendix 1).

The process of analysis with MAXQDA was conducted through two procedures to examine the entire body of data. Firstly, proceeding with the software, the second cycle of coding in the design literature yielded 11 main codes and 3 sub-codes, subsequently providing the coding scheme more analytic strength and helping identify patterns in the DLLs’ reports later (See Figure 2). In addition, these 14 codes were clustered in two themes: Design Tendencies and Design Competences in order to provide informative titles for the result of analysis (See Figure 3).

Secondly, the DLLs’ reports were read and analysed with the facilitation of MAXQDA. On the one hand, this round of analysis utilised the aforementioned 14 codes as lenses to examine the DLLs’ reports. On the other hand, the DLLs’ reports were analysed through clustering the emergence of patterns based on grounded theory. In this phase, the analysis yielded 3 main codes and 3 sub-codes additionally, and categorised them as one added theme – New Design Capabilities. Meanwhile, the previous theme identified in the literature– Design Competences was separated into two, namely Design Capabilities and Design Skills, in order to illustrate the outcome of analysis more specifically (See Figure 4). These themes were clustered based on recognising the latent meanings of grouped codes and named with an attempt at offering clear guidance to explain the notions of design. Collectively, the four main themes including the 20 codes identified in the design literature and DLLs’ reports present the notions of design in this study. However, to avoid confusion, the main codes will be addressed as sub-themes and the sub-codes addressed as sub-sub-themes in the findings section.

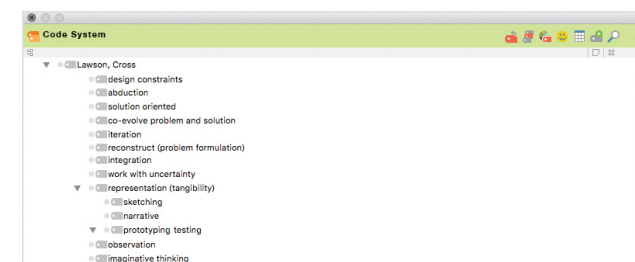


Figure 2- Code scheme of analysed design literature in MAXQDA

Figure 3 - Clustered themes from code scheme of analysed design literature

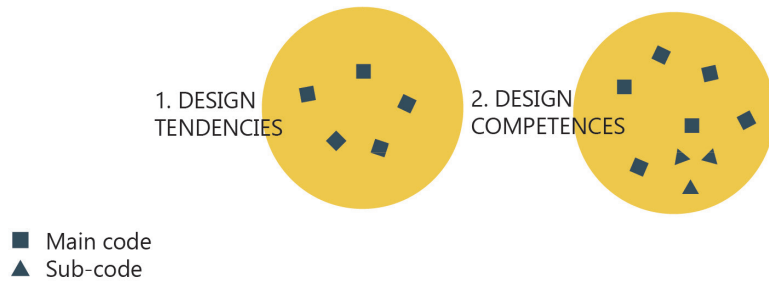
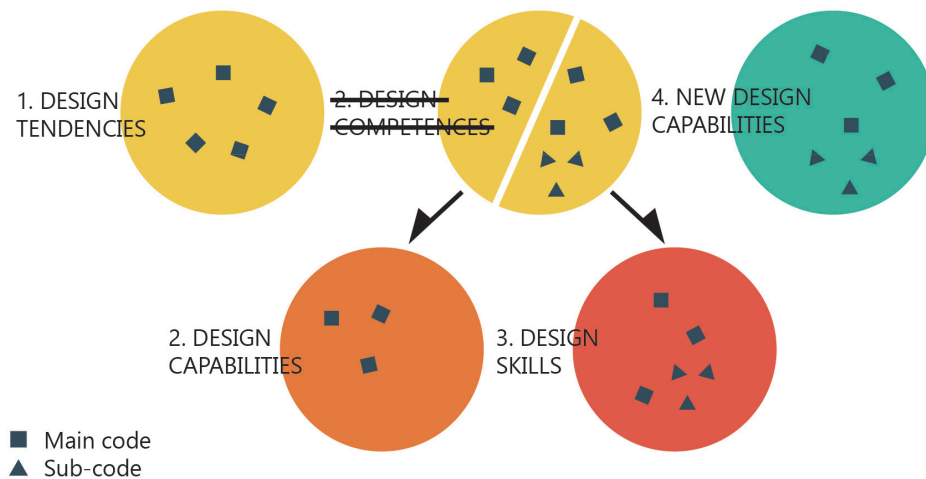


Figure 4 – Clustered and renamed themes from code scheme of the entire analysed data



In summary, the study has evolved through iterative rounds of analysis in order to identify common or discrepant themes in the aforementioned books and reports (See Table 4). The process began with an inductive approach to analysis in order to recognise themes from the books. After the first analysis, the themes yielded by analysing two scholars are serve as investigate lenses in examining the various notions of design that are identifiable in the reports from the four DLLs. The process was deductive in the sense that the yielded coding scheme was utilised to analyse the explicit and implicit notions of design in the publications from the DLLs. It is still inductive analysis, however, in the sense that this study also investigates emergent themes that were not covered by Lawson and Cross through thematic analysis and candidly reports as part of the findings.

	ANALYSIS	OUTCOME
» ACTION 1	Preliminary understanding: reading Lawson (2004, 2005) and Cross (2006, 2011)	Summarise the context of the books in digital format
» ACTION 2	Grounded theory method: recognise the patterns in the four books based on previously summarised notes (Note: Begin to read the DLLs' reports, take notes)	Gain better acquaintance with data and learn the difference between Lawson and Cross
» ACTION 3	Coding Lawson's and Cross' books with MAXQDA software: second cycle coding based on the previous summary and preliminary patterns recognised by grounded theory	14 codes identified and subsequently categorised as 2 preliminary themes Design Tendencies and Design Competences
» ACTION 4	Coding the DLLs' reports with MAXQDA software: finalise reading DLLs' reports; use 14 codes mentioned above to examine the reports; meanwhile, identify emergent patterns	Add one extra theme New Design Capabilities based on the 6 additional identified codes; separate the theme of Design Competences into Design Skills and Design Capabilities

Table 4 – A map of analysis procedures

02

FINDINGS

2.1 OVERVIEW OF THE ANALYSIS: DESIGN TENDENCIES, CAPABILITIES, AND SKILLS

I have identified three main themes: Design Tendencies, Design Capabilities, and Design Skills. Each main theme consists of multiple sub-themes, and only one sub-theme, namely representation consists of three sub-sub-themes: visualisation, narrative, and prototyping. Accordingly, Table 5 demonstrates an overall picture of my analysis in terms of the notion of design depicted by Lawson and Cross. I will return to each theme in detail later from the section

MAIN-THEMES	SUB-THEMES	Bryan Lawson: How designers think (2005), What designer know (2004)	Nigel Cross: Designerly way of knowing (2006), Design thinking (2011)
1. DESIGN TENDENCIES	Peculiarity of design problem	●	○
	Abductive reasoning	○	○
	Solution-oriented	○	●
	Co-evolve problem & solution	●	○
	Iterative cycle	○	●
2. DESIGN CAPABILITIES	Reconstruction of briefs	●	●
	Integration	●	○
	Coping with uncertainty	○	○
3. DESIGN SKILLS	Observation		○
	Imaginative thinking	○	○
	Representation	●	●
	- visualisation	●	●
	- narrative	●	○
- prototyping to test	○	○	

Table 5 – An overview of Lawson’s and Cross’ literature

LEGEND — Not present ○ Present (1-5) ● Frequent (>5)

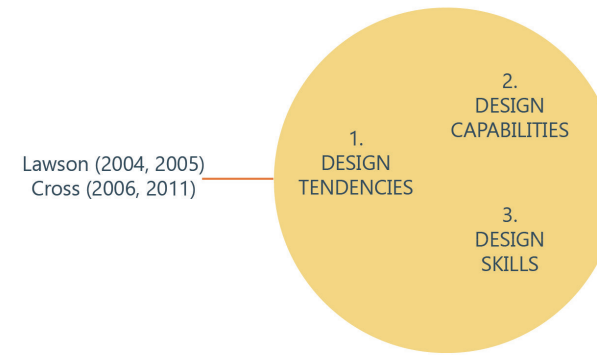


Figure 5 – The notion of design depicted by Lawson and Cross

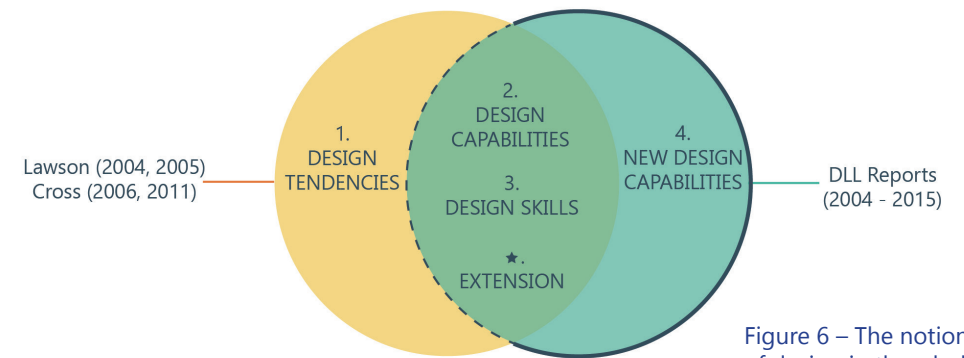


Figure 6 – The notion of design in the whole dataset

2.4, but for now, it is notable that Lawson and Cross strongly agree with each other on “reconstruction of briefs” and “visualisation” despite the disciplinary difference. Subsequently, this table could be reviewed in Figure 5.

An overview of my analysis of the whole dataset is illustrated in Table 6 – Lawson and Cross with the addition of the reports from design-led labs (DLLs) namely, the Design Council (UK), Public Policy Lab (US), Helsinki Design Lab (FI), and MindLab (DK). It is notable that the DLLs do not discuss much Design Tendencies with the exception of the “iterative cycle” but rather focus on the extended Design Capabilities and Design Skills – the extended sub-themes are marked with star (★) mark. In addition, a significant number of New Design Capabilities emerges as the fourth main theme. Correspondingly, this table could be reviewed in Figure 6.

Table 6 – An overview of the whole dataset

MAIN-THEMES	SUB-THEMES	Bryan Lawson: How designers think (2005), What designer know (2004)	Nigel Cross: Designerly way of knowing (2006), Design thinking (2011)	Design Council (UK)	MindLab (DK)	Public Policy Lab (US)	Strategic Design Unit of SITRA (Helsinki Design Lab, FI)
1. DESIGN TENDENCIES	Peculiarity of design problem	●	○	○		○	○
	Abductive reasoning	○	○				
	Solution-oriented	○	●			○	○
	Co-evolve problem & solution	●	○				○
	Iterative cycle	○	●	○	○	●	●
2. DESIGN CAPABILITIES	Reconstruction of briefs	●	●	●	○		●
	Integration	●	○	★	★	★	★
	Coping with uncertainty	○	○				○
3. DESIGN SKILLS	Observation		○	★	★	★	★
	Imaginative thinking	○	○	○			○
	Representation	●	●	●	●	●	●
	- visualisation	●	●	★	★	★	★
	- narrative	●	○	○	○	○	○
	- prototyping to test	○	○	★	★	★	★
4. NEW DESIGN CAPABILITYIES	User-centricity			●	●	●	●
	- professional empathy			○	○		●
	- co-design			●	●	●	●
	- co-production			●	●	●	○
	Stewardship			○	○		●
	Facilitation			●	○	○	●

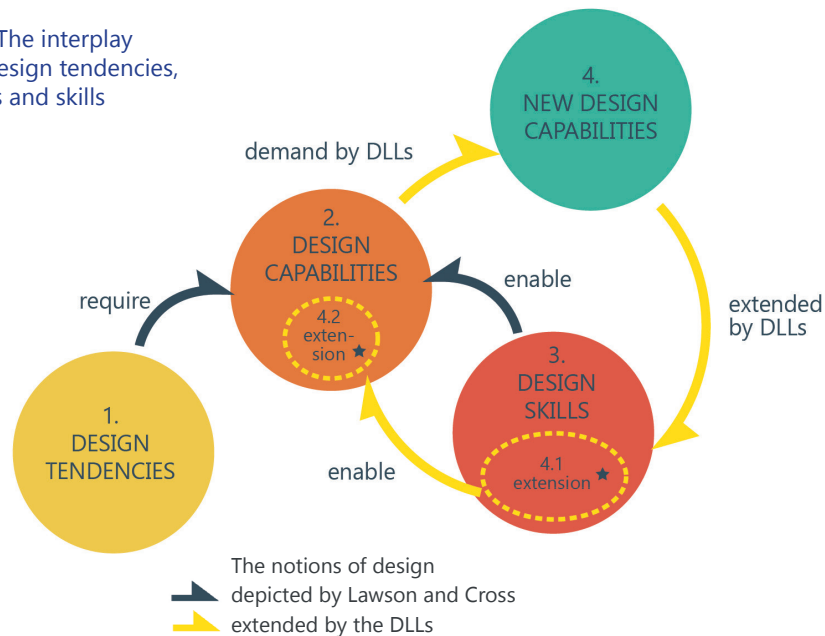
LEGEND — Not present ○ Present (1-5)
 ★ Extended ● Frequent (>5)

2.2 INTERPLAY OF DESIGN TENDENCIES, CAPABILITIES, AND SKILLS

In exploring the notion of design by the two scholars and design-led labs (DLLs), I identified the interplay of the main themes (See Figure 7). This visualisation is meant to help the defined themes to demarcate the different components from each other, and provide a better understanding of how they relate to each other.

In Lawson's (2004, 2005) and Cross' (2006, 2011) views, design tendencies describe the characteristics of design through the "peculiarity of the design problem", "solution-oriented mindset", "entwined nature of problem and solution spaces", "iterative cycle", and "abductive reasoning". Because of these design tendencies, the discipline has developed certain capabilities in order to respond to them and proceed with the design process. These are namely the "reconstruction of briefs", "thinking integration", and "coping with uncertainty". These capabilities yet require the designers to gain skills to operationalise the design projects that are "creating representations of the design", "observing for identifying problems", and "being imaginative". Skills are more specific than capabilities, and entail concrete techniques to support the designers' capabilities so as to succeed with the design outcome

Figure 7 – The interplay between design tendencies, capabilities and skills



2.3 EXTENDED AND EMERGENT DESIGN CAPABILITIES AND SKILLS

The reports from the DLLs extend much of the design capabilities and design skills and add new design capabilities. According to the result of the analysis, "system thinking", "visualisation", "testing", and "ethnography" could be considered to be a set of extended design competences that are evolved from the original design capability or skills that mean to enable new design capabilities (See Table 7). They can be recognised with different names in some part of design literature, yet their notions have been further developed for various purposes in order to adapt for the new context – government. For example, sketching is traditionally an essential skill which enables designers to present their ideas and discuss with others (Cross 2006: 53) while the DLLs feature that visualisations empower disparate stakeholders to understand the problem without any constraints (cf. Bason et al. 2013: 16-17; Boyer et al. 2011: 15). These extended design skills are heavily emphasised in the DLLs' project cases.

MAIN-THEMES	SUB-THEMES	Bryan Lawson: How designers think (2005), What designer know (2004)	Nigel Cross: Designerly way of knowing (2006), Design thinking (2011)	The four DLLs
2. DESIGN CAPABILITIES	Integration	●	○	★
	Observation		○	★
3. DESIGN SKILLS	Visualisation	●	●	★
	Prototyping to test	○	○	★

LEGEND — Not present ○ Present (1-5)
★ Extended ● Frequent (>5)

Table 7 – The overview of extended design capability and design skills by the DLLs

2.4 DETAILED ANALYSIS OF EACH COMPONENT

The six emergent elements in New Design Capabilities are “user-centricity”, “professional empathy”, “co-design (empowerment)”, “co-production (sharing ownership)”, “stewardship”, and “facilitation” (See Table 8). It is notable that these capabilities are hardly discussed in Lawson (2004, 2005) and Cross (2006, 2011). For example, Lawson (2005) discusses the role of users in just few pages, in which the users are depicted as the least influential and passive players in the design process. This phenomenon argued by Lawson has become the DLLs’ main focus and explored various methods to approach their users.

In summary, the themes of design tendencies, design capabilities, design skills, and new design capabilities encapsulate the notion of design depicted by the DLLs and the further connotations of the above design components will be elaborated in the following section.

MAIN-THEMES	SUB-THEMES	Design Council (UK)	MindLab (DK)	Public Policy Lab (US)	Strategic Design Unit of SITRA (Helsinki Design Lab, FI)
4. NEW DESIGN CAPABILITYIES	User-centricity	●	●	●	●
	- professional empathy	○	○		●
	- co-design	●	●	●	●
	- co-production	●	●	●	○
	Stewardship	○	○		●
	Facilitation	●	○	○	●

Table 8 – The overview of emergent design capabilities by the DLLs

LEGEND

—	Not present	○	Present (1-5)
★	Extended	●	Frequent (>5)

- 2.4.1 DESIGN TENDENCIES
 - Peculiarity of design problem
 - Abductive reasoning
 - Solution-oriented mindset
 - Entwined nature of solution and problem spaces
 - Iterative cycle
- 2.4.2 DESIGN CAPABILITIES
 - Reconstruction of briefs
 - Integration to system thinking
 - Coping with uncertainty
- 2.4.3. DESIGN SKILLS
 - Observation to ethnographic research
 - Imaginative thinking
 - Representation
- 2.4.4 NEW DESIGN CAPABILITIES
 - User-centricity
 - Professional empathy
 - Co-creation approach: co-design and co-production
 - Stewardship
 - Facilitation

Note: the different marks (), (○), (●), (★) appearing at the beginning of each section represent the different level of emphasis on the respective design components between the two scholars and the design-led labs (DLLs) (See Table 9).

Not present	Present (1-5)	Frequent (>5)	Extended
	○	●	★

Table 9 – The legend for different level of emphasis

2.4.1 DESIGN TENDENCIES

Design is a unique discipline that is drawn to the tendencies of the “peculiarity of the design problem”, “solution-oriented mindset”, “entwined nature of problem and solution spaces”, “iterative cycle”, and “abductive reasoning”. This section introduces what design is inherent to be and therefore has influenced individual characters of a designer.

2.4.1.1 Peculiarity of design problem– design constraints

As design problems are particularly known for their ill-defined status, inquiring and recognising the structure of a design problem would enable the designer a comprehensive view of design. As noted by Lawson (2005: 90), a design problem consists of a disparate set of constraints that may be imposed by legislations, clients, users or even designer themselves. These constraints are collecting with design process in order to support designers to reconstruct a rather well-structured design problem. In the design process, design constraints can be found in the initial design task, introduced by the designers or evolved while they explore solutions.

Each constraint has different levels of influence on the design problem. Constraints created by legislators may be the most rigid and demanding one in the design process and has been determined already with the initial design task. Legislations define the standards regarding issues of safety or utility that designers must conform so as to derive the permission to release their works in front of the public. Commenting on this constraint, Lawson (2005: 89) indicates that the conflict regularly exists between the designer and legislator, and both sides consider each other as difficult partners. Conversely, Cross (2011: 37-39) demonstrates that a stark regulation could become a drive to urge the designer to create a radically innovative design. Taken together, one may suppose that although constraints set by legislators are fixed, designers may derive additional inspiration when attempting to fit in these standards.

The other two constraints generated from clients and designers themselves are rather flexible and derived when evolving over the project. This client-designer relationship seems crucially influential to contribute constraints to the design process. As Lawson (2005: 254) observes: ‘many designers seem to prefer the continuing involvement of the client throughout the process.’ Clients clearly own abundant knowledge about requirements of the design; nevertheless, often designers found the initial design task given by the client was not explicitly articulated and difficult to directly work with. As a result, designers employ a set of skills to involve their clients sequentially in the process of exploring the design problem together so as to derive insightful information to correct the constraints.

2.4.1.2

Abductive reasoning– the question of what if

Despite clients, designers are anticipated to introduce some design constraints as well. With experiences and professional knowledge, designers possess their personal expectations on how their ideas should work when receiving the design task. As argued by Lawson (2005: 88), designers tend to impose constraints learnt from prior projects on current design in order to pursue the further exploration of design problem; meanwhile, they can prioritise the influence of constraints and do not insist on including their opinions. Hence, designer-generated constraints can be considered as rather flexible that could be freely accepted, or excluded in the design process.

Last but not least, the users. The constraint arising from the users' demands is described as the necessity in the design process but there seems to lack of formal access to approach them. In fact, the issue of users has been interestingly discussed in Lawson's study. Lawson (2005: 168-170) indicates that the idea of user-centred approach has been utilised in architecture; nevertheless, the opportunity of user involvement in building design occurs to be unpredictable. Besides, his argument of a remote user implies that the user represents the least influential player in the design process (Lawson 2005: 86). Hence, it seems that the gap between the design process and the user has been noticed; nevertheless, designers have not yet discovered any effective tactics to understand their users. On the contrary, the importance of the user in the design process has been not only profoundly agreed by every DLL but also fostered as new competence for them to tackle challenges. This topic will be articulated further in the later section – new design capabilities.

Taken together, all of the design constraints reviewed contributes to different levels of influence and characteristics to a design problem. Although the act of reconstructing the design problem mainly involves with designer's capability of conjecturing solutions with insufficient information and personal interpretation, knowing design constraints presents relatively essential to support designers to organise the complex design problem. By understanding types of design constraints, the designer is able to comprehend the design problems more systematically.

Design activity appears to be exploratory which proposes variant original ideas. Designers do not seek a correct but, rather, a better answer among those ideas generated. As noted by Cross (2011: 27), abductive reasoning represents the essence of the design process. He (2006: 53) argues that design employs 'abductive thinking' which conjectures or advises what things may be, instead of manifesting how they should be. While science proves the existing facts, a creative design attempts to invent something novel. In addition, Cross (2011: 27) provides a study conducted by the British mathematician and architect Lionel March (1976) to demonstrate that the reasoning of design is divergent from the logic of science. The design process drives neither linearly nor logically. This act of proposing "something might be" does not fit in the context of two common types of scientific reasoning – deductive and inductive. In contrast, the concept of abductive reasoning was derived from an extensive field of philosophy.

In a similar view, Lawson (2005: 125) also compares the nature of design with science and points out that 'design activity is prescriptive' rather than 'predominantly descriptive' that explores questions of what if. As the character of the design problem usually remains ill-defined, there is no correct answer for any design problems. Designers speculate about the potential situation and suggest the probable future. During the design process, plenty of ideas are generated to synthesise the best design solution. In other words, designers tend not to validate why things should be nor demonstrate how things are done; they introduce what things might develop into (Lawson 2005: 25).

2.4.1.3 Solution-oriented mindset– conjectures to learn

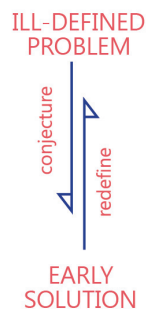
A large body of literature on design research has investigated the problem-solving mode among designers. It seems that not only designers are trained as solution-oriented but also the limited resolution of design process forces them to seek early solution conjectures as a means to learn about the problem instead of studying the problem itself independently.

Designers contemplate differently from ordinary problem solvers can be recognised in the following case. For example, Lawson argues (2005:42-43) that the scientists think as the problem-oriented strategists whereas the designers perform as solution-oriented strategists. As evidence of this, he repeated his laboratory study on cognitive behaviour that indicates the scientists draw their attention to research the maximum amount of solutions rapidly to realise the elemental rules, whereas the designers persist in achieving a desirable outcome (ibid.). The result of experiment demonstrates the uniqueness of designer's way of thinking in contrast to other disciplines.

A factor that needs to be raised on the issue of the designers' solution-oriented tendency, however, is the educational influence. Commenting on this, Lawson reports (2005: 42-44) that the architecture students are educated through a series of practical studio endeavours and accepted different criticisms of their works in order to become the professionals. Unlike other disciplines, design features mainly the outcome. 'As in the real professional world, the solution is everything and the process is not examined' (Lawson 2005: 42). In the same vein, the Public Policy Lab has briefly illustrated that a series of design investigation activities they conducted are meant to spark a solution rather than collect quantitative data (Dragoman et al. 2013: 39). Consequently, designers are not required to study problems but generate a preferable solution.

The above arguments from Lawson are in agreement with Cross and has been cited in his publication as well. In addition, he indicates that designers do not pursue a full understanding of a problem before starting to create solutions (Cross 2006: 101). In fact, the nature of ill-defined design problems prompts the designer to seek early solution conjectures as a means to learn about the problem instead of studying the problem itself independently. These early solutions contain components that help the process of ill-defined problem redefinition (See Figure 8). Hence, the tendency of the solution-oriented mindset that seeks for early conjectures represents the core of design activity and it allows designers to tackle the difficulties of ill-defined problems. Overall, these studies collectively provide some evidence to indicate that solution-oriented tendency exists in the design process.

Figure 8 – Designers' thinking process between a problem and a solution



2.4.1.4 Entwined nature of solution and problem spaces – co-evolution

In the design process, designers seem unable to isolate the analysis of problems and the synthesis of solutions into different stages. Inherently, the character of ill-defined is impossible to be comprehensively described as it requires the design problems to illustrate to some acceptable solutions in order to be understood progressively (Lawson 2005: 48). Interestingly, this is also true in the case when clients provide a brief to a designer. Similar to what designers do, clients often find themselves able to articulate their problems better when referring to some existing solutions (ibid.). It seems the nature of design has resulted in the consequence of the design problem and solution often emerging together. Correspondingly, the Helsinki Design suggests a diagram of 'continuous feedback loop' rather than linear string to demonstrate the way problem and solution evolving each other (Boyer et al. 2011: 32) (See Figure 9).

To be more specific, a design solution can be considered to be a partial problem. As claimed by Cross (2006: 102), this fact influences designers to create and utilise early ideas as a means to complete more structure to the problem. Once designers derive new questions inspiring by formulated solutions, they continue another round of solution ideation. Therefore, design problem and solution are interrelated that constantly develop each other in details like continuous reinforcing feedback loops that produce generations of alternatives (See Figure 10). This 'co-evolution of solution and problem' will endure the entire design process until it achieves a satisfactory solution (Cross 2011: 123).

Figure 9 – A design problem and solution loop

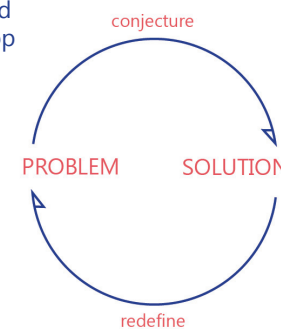
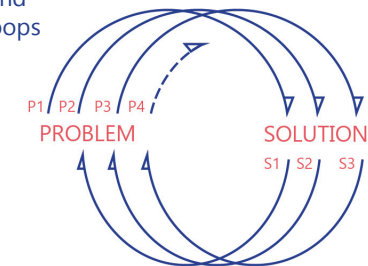


Figure 10 – Continuously evolving design problem and solution loops



2.4.1.5

Iterative cycle– until deadline

The design process appears to be a pattern that involves several rounds of analysis-synthesis-evaluation activities. The likely explanation is that the design activity comprises different levels of specification progressions. As described in the previous section, the development of design solutions mostly begins with insufficient information. Thus, designers tend to co-evolve the problem and solution that generates early conjectures to learn further details of the design problems. In this regard, Lawson (2005: 36-40) further argues that Markus (1969) and Maver's (1970) architectural design process map offers a view on the necessity of proceeding design activities with 'return loops' from the broad scope to particulars. The more specific details allow designers to revisit the analysis phase and then continue another round of the design process and this 'iterative cycle' normally lasts until the deadline has arrived (Lawson, 2005: 40).

Unlike Lawson, Cross treats iteration neither in much detail nor explicit descriptions; however, he seems to agree the act of iteration has been executing all over the design process. Words which included 'in cycles of analysis, synthesis and evaluation' (2006: 110), 'iterative activity' (2006: 34) and 'reoccurs periodically throughout the task' (2006: 103) can be recognised in Cross' research that indicates the occurrence of iteration in design activity. Those expressions appeared when Cross articulated the design progression, process of problem formulation, and evaluation. This evidence suggests the act of iteration happen in several phases of design activity that not only the nature of design problem prompts the designers to reframe it continually but also designers themselves tend to conduct iterative rounds of modelling, testing and modifying in order to revise their ideas.

The iteration, which has been abundantly discussed by the DLLs, however, performs more like a design approach rather not a tendency. In agreement with the two scholars, the DLLs describes design as an iterative creation that 'follows a cycle of problem-framing, data gathering and analysis, idea generation, prototyping, testing and back to problem-framing' (Dragoman et al. 2013: 19). Nevertheless, they seem to draw more attention to the benefit of conducting design process iteratively. For example, the Public Policy Lab illustrates that an iterative user testing enables tailored responses to people's true needs (Kottamasu et al. 2013: 65). Moreover, MindLab claims repetitive testing allows the proposition to implemented 'in relation to context, practical outlook and consequences for people' (Bason & Christiansen 2013: 33). By considering all of these comments, it seems that the DLLs foster iteration as one of the design approaches and especially maintain its utilisation in the phase of prototyping and testing (See Prototyping to test p46).

2.4.2 DESIGN CAPABILITIES

Owing to design tendencies as mentioned earlier, designers are required to equip with some capabilities in order to conduct the design process. The capabilities such as "reconstructing the design briefs" and "thinking integration", meanwhile; "coping with uncertainty through entire design process" are indicated in Lawson's and Cross' research as well as the DLLs' reports.

2.4.2.1

Reconstruction of briefs– redefines the ill-defined

Design outputs often impress people by offering them what they truly desire rather than what they are asking for. Inherently, designers tend to explore the given tasks beyond the initial context by reconstructing the design problem within the extensive scope of the problem. This designer behaviour has been widely discussed among scholars for the past few years. In fact, Lawson (2005: 292-293) and Cross (2006: 99-100) have both stated that the design problem is characteristically known as ‘ill-defined’ and cannot be comprehensively addressed. Under these circumstances, designers must use their knowledge and experience to develop characteristics for the problems in order to ‘give structure to ill-structured or wicked problems’ and reframe the problems in a manner that prompts the further development of solutions (Lawson 2005: 292). As a result, the capability to reconstruct the design problem seems to be essential for a designer.

Two moves can be expected as designers reconstruct the given tasks. Firstly, designers produce early conjectures to obtain and identify elements for reconstructing the design brief. In design, the given task is often presented in an unclear format, thus requiring further definition. Commenting on this, Cross (2006: 100) stresses that identification often occurs when designers initiate solution conjectures rather than endeavouring to study the problem itself. Given that these speculations generate sources of structure that are lacking in the primitive design problem, the attempt to produce early conjectures together with the capability to identify the necessary information for briefing, are both equally important for encouraging the act of problem reconstruction.

Another move reflects a designer’s personal interpretation, as both the design solution and the design problem are perceived internally. One design task can result in diverse solutions when designers reconstruct the problem from different perspectives. Both Lawson (2005: 275-277) and Cross (2006: 102-103) adopts Schön’s (1983) notion of ‘framing’ to explain how designers can look at the same problem differently. By drawing on Schön’s concept (1983), Cross (2006: 102-103) elaborates upon it, stating that designers hold their own views and select the preferable features of the problem to present and set reasonable boundaries of the solution to explore. That is to say, the act of reconstruction is rather personal in design activity. This opinion is in agreement with Lawson (2005: 292), who points out that even though Schön’s

definition of ‘framing’ seems vague, choosing a proper ‘frame’ or ‘focused area’ in the solution space represents one of the essential endeavours in the design process. These chosen frames are employed as different sets of angles to investigate the problem and solution space in order to manage the complexities of the issue and negotiate a desirable outcome. In addition, Lawson (2005: 159) articulates that this capability is driven by a set of design attitudes, beliefs and values that are accumulated through designers’ previous experience and knowledge. In that sense, designers naturally have their distinct ways to guide them while reconstructing the problem.

The act of brief reconstruction can be recognised in the DLLs’ design processes as well. As the Helsinki Design Lab claims, ‘[S]eeking a diversity of new and different inputs helps complement whatever knowledge exists in a given area and contributes to the formation of a better big picture’ and this appears to be what a strategic designer does (Boyer et al. 2011: 34). In accordance with the two scholars, this suggests that designers are not satisfied with the initial task given but investigate further information to restructure the problem. In the DLLs’ cases, it seems that the DLLs’ use of reframing briefs has resulted from their specific user-centric focus. Various user-centred approaches are fostered to explore unknown or different perspectives of briefs by defining intended users’ actual needs in order to redefine the design problem.

2.4.2.2

Integration to system thinking– in pursuit of holistic responses

As we described on the previous page, the design problems are composed of diverse constraints and present in a multi-dimensional form. Designers are expected not only to coordinate all these limitations but also to create a holistic solution in response to this complexity. The capability of integration seems to be demanding in design activity and influential, specifically in the process of synthesising a design solution.

Thinking integration appears to be a critical capability in succeeding design. According to Lawson (2005: 122), enabling a comprehensive solution is necessary for design since there are plenty of design constraints that designers must take into consideration simultaneously. This comment is certainly true in the case of chair design, which is introduced by Lawson (2005: 58-59). A chair design may simply fail if designers ‘think separately’ about issues of aesthetic, structure, and functionality. In fact, the solution should satisfy a whole cluster of problems and consider not only the chair itself but also more general issues, such as production and price. This case demonstrates that a desirable design solution is a holistic response. To be more specific, designers investigate problems from the perspectives of both small details and big issues in parallel, then integrate the constraints discovered in order to create the integrated solutions accordingly.

As discussed above, this seems to imply that the ability to integrate disparate requirements has become one of the criteria to recognise a successful design and designer. According to Cross (2011: 136), the capability of thinking integration appears when a designer attempts to resolve a problem. He illustrates that this style of thinking enables designers to integrate different levels of requirements from tangible principles to systemic goals, into a coherent whole that leads to solutions. Likewise, the importance of integration in the design process has obtained greater emphasis among the DLLs in comparison with Lawson and Cross. The DLLs seem to favour the idea that utilises integrative thinking as a means to prompt a comprehensive and systemic speculation upon the entire design process and adopt it in the following occasions.

Systemic integration organises different scales of perspectives into a coherent whole. Based on the DLLs’ reports, the ability to integrate enables the design process to be employed as a platform to connect siloed structures and incorporate discrete solution ideas among governmental institutions (cf. McNabola et al. 2013; Bason 2013; Boyer & Cook 2012). In other words, the design process not only integrates discrepancies between personnel from diverse departments but also incorporates a holistic solution to respond to a wide range of user needs. Moreover, designers ‘act as the intermediary between disparate ideas, viewpoints and even goals’ that transcribe a set of complexities into a system map for integration (Boyer et al. 2011: 327).

Gaps between silos or citizen demands prevent governments from reacting to the challenges inclusively and also result in procrastination in their response. As evidence of this, the Helsinki Design Lab used an example of the digital service of the Danish government, which was conducted by MindLab, to highlight the influence of mapping out a system thoroughly (Boyer et al. 2013: 110). When the Danish government sought to upgrade the business registration online service, “Branckekode.dk”, MindLab redesigned the new digital service successfully with the competence of system thinking. In the design process, diverse perspectives of the service were compiled and integrated into a system map that clearly depicted the interaction between users and government and revealed the potential fault spots simultaneously. Thinking in a systematic way empowers designers to avoid a variety of gaps in the services and then coordinates the actors to respond to the plan consistently. In the end, the renewed digital service was able to satisfy the needs of the tax authority, frontend staffs, and business owners and became an outstanding case.

To sum up, system mapping and thinking utilise the capability of integration to prompt a zoom-out that switches designers’ attention between different scales of the plan. Also, demonstrating a clear picture of the connections and causalities strengthens the designer’s coordination on disciplinary silo collaboration.

2.4.2.3

Coping with uncertainty- enables early conjectures

As designers tend to start creating solutions before fully understanding the problem, being able to tolerate with ambiguous situations becomes a characteristic capability in design activity. In fact, there is a great volume of published studies of Lawson and Cross indicated a good designer should be capable of coping with uncertainty (Lawson 2004, 2005; Cross 2006, 2011).

As design activity is often situated in the position with limited resolution, there are two types of uncertainties that require designers to be comfortable with. Firstly, designers have to work with uncertain futures. It is fairly accepted that designers tend to integrate broader context besides the design itself when creating tentative solutions. Lawson (2005: 112-114) argues that the design outcome should consider ahead societal changes and technological advancements. With the intention of prescribing the future, design unfortunately becomes more intractable because of unpredictable technology development. Therefore, means which included delaying the decisions, leaving flexibility with solutions, or creating for throw-away are adopted by designers in order to tackle the uncertain future during the process (Lawson 2005: 114-116).

Another uncertainty appears to be the design process itself. As explained in the former section, problem reconstruction is a continuous activity that all relative factors often emerge together at the end of the process (Lawson 2005: 48). Designers are regularly exposed to ambiguous situations. Several interviews with architects have led Lawson (2005: 153-154) to propose that a competent designer should be capable of coping with uncertainty. Furthermore, he argues that designers tend to keep 'parallel lines of thought' to suspend the judgement upon the solutions and continuously develop these incomplete ideas (Lawson 2005: 212-213). In agreement with Lawson's view about lines of thought, Cross (2011: 26) implies that the capability of 'tolerat[ing] and work[ing] with uncertainty' is compelled in design activity. Designers are not only required to generate early conjectures with insufficient information but also they intentionally leave the conjectures unresolved as long as possible for further solution development (Cross 2006: 54). Correspondingly, the Helsinki Design Lab (Boyer et al. 2011: 47) explains 'being comfortable with uncertainty' is a capability for the designer to manage a pathway in pursuit of solutions regardless of scepticism. Designers tolerate ambiguity to explore solutions; meanwhile, they continuously interact with solutions initiated with insufficient information until the project ends.

2.4.3. DESIGN SKILLS

The design skills entail more specific and tangible techniques to enable the design capabilities. Designers utilise skills that included "creating representations of the design", "observing for identifying problems", and "being imaginative" to facilitate the design process to generate a desirable outcome.



2.4.3.1

Observation to ethnographic research

The skill of observation might be a critical source to inspire solutions in design activity. Through observing how people behave in current situations, designers seem to be able to discover certain points to continue exploring the design problems. Even though no attempt is made to identify the association between the act of observation and the designer skill in the literature, few indications can be discovered in Cross' studies about the professional designers.

An example of designer's observing skill is implied in the study of successful racing car system improvement (Cross 2011: 40-42). As a world leading racing car designer, Gordon Murray realised that there are limited improvements with car design itself in pursuit of the better record. Therefore, the idea of shrinking stop duration at pit stop was reasonably brought up.

"To improve pit-stop procedures, Gordon hired a film crew to film the team practicing pit stops, and then played back the film, stopping it to identify difficulties and errors, and devising ways to improve to procedures' (Cross 2011: 41).

Through the description, it implies that the video allowed Gordon to observe the entire refuelling procedure into details to point out several pain points for improvements. By that time, various original ideas were invented from the findings of video investigations and then devised to enhance the productivity of the pit-stop system. Together with the utilisation of filming facility and observing skill, Gordon achieved a breakthrough in the entire racing car field in the 2010 season and other competitors soon followed his inventions regarding pit stop. The video observation was the key to understanding difficulties in lived situation for improvements.

Unlike two scholars do not explore this design skill in much detail, the DLLs picked up the idea of looking at lived situations closely to understand the real problems. They began to explore the utilisation of observing skill in the design process. The utilisation of various observational techniques among the DLLs has been widely underlined as one of most important design research

tools. To be more specific, instead of featuring the single skill of observing, the DLLs demonstrated how a whole set of ethnographic research benefits their design process in which participant observation is considered to be the most common approach.

Ethnographic research represents a qualitative research method that enables designers to disclose in-depth or hidden insights based on the real circumstances. The ethnography approach ranges over a variety of methods which includes a series of user engagement activities which included field observations, interviews, design probes, or even co-design workshops that intend to recognise people's behavioural patterns and latent needs which they may not be aware of themselves either. In fact, the DLLs' reports have largely discussed how ethnographic methods enable them to understand how design is experienced by users in the current situation. For example, video recording in field research has adopted as a very practical tool for exploring the latent problems. As evidence of this, the Helsinki Design Lab (Boyer & Cook 2012: 11) reports the case of surgical instrument redesign was conducted with heavy video observation to capture surgical staffs' working flow in the operation environment. Empowering by the videos, designers discovered plentiful problems that 'were not being addressed by the surgical team'. Similarly, the Design Council acknowledges that ethnography enables the investigations 'moving beyond what people say they do to what they really do' in order to demonstrate evidence for identifying people's unspoken aspirations in particular (Design Council 2013: 54). In other words, careful close observation assists in shedding light on the blind spots for sources of inspiration. The insight collected through ethnographic research becomes the decisive inspiration sources to the design owing to its deep understanding of the users in a real context.

2.4.3.2

Imaginative thinking

Design is widely accepted as a creative job and designers intend to create something not yet existed. For that reason, a certain degree of imagination seems necessary in design activity for the creativity. This imaginative thinking naturally leads designers to conjecture solutions divergently without reality limitations. As Zeisel (1984) argues that imaging should represent as one of the fundamental activities (Cited by Lawson 2005: 119), designers partially count on their imaginative thinking to explore the solutions beyond the given design tasks. In addition, it seems to be essential that designers employ the imagination to '[think] through some scenario which is possible but not actual' in order to conjecture viable solutions (Lawson 2005: 130). In this regard, the Helsinki Design Lab (Boyer et al. 2011: 139) has briefly mentioned the designer deliberate upon propositions by exploring and leveraging 'the combination of pragmatism with imagination'. That is to say, even though designers' imagination often has to be reconciled with the reality, it is apparently known as one of particular design skills.

2.4.3.3

Representation

Designers are often expected to produce some visible outputs at the end of the design process. Broadly speaking, these outputs can be presented in a variety of styles including sketches, texts, mock-ups, and prototypes that are referred to as 'representations' by Lawson (2005: 293). In fact, Lawson considers these representations as 'central inputs to the thought process' rather merely the end outcome of the design.

The purpose of creating representations may be classified on the basis of Lawson and Cross as tools for reflection, communication and risk management. To begin with, the act of producing representations is a reflective process for designers. These representations enable designers to externalise their thoughts (Lawson 2005: 293). Designers employ the representations as a means to interpret the design context and concretise an initial idea to start working with. The created representations allow designers to reflect on their perceptions and thoughts to continually work on their designs.

Moreover, designers adopt representations as a medium with which communicate with others. By externalising designers' abstract thoughts, design intents and features displayed in the representations enable designers to discuss their design with colleagues or clients (Lawson 2004: 32-33). Sketches, mock-ups, and scenarios facilitate the process of conveying the idea to project participants to reach the same level of understanding. As a result, the use of representations for sharing the ideas is a tool to avoid misunderstandings in the design process.

Last but not least, representations mitigate the risk of failure. According to Lawson (2005: 26-27), designers create a representation of a design rather than an actual design owing to cost-effective issues. On the one hand, there are wide-ranging fidelities of representations available for designers to select suitable ones working with respect to time. Representations such as sketches or models require less time to produce and thus enable designers to handle a design task more rapidly. On the other hand, reduced costs allow designers to generate multiple rounds of modifications during the design process. The production of representations affords designers more room to experiment with their ideas.

As these benefits are evident, the skill to generate types of representations plays a pivotal role in the design process. Commenting on this, the Design Council acknowledges that 'making seemingly intangible things tangible to the teams working on them' is a valuable and efficient skill in the discipline of design (McNabola et al. 2013: 7). By the same token, MindLab claims a real change is driven by a designer's skill in creating representations that enable people to understand an abstract future vision (Bason & Christiansen 2013: 37). The utilisations of design representations has emerged as a powerful tool in the development of public services and policymaking among the DLLs. Diverse types of representation are available for designers to apply in different contexts. The following section will provide a more comprehensive view on the impact of three main types of representations: sketches, narratives and prototypes.



Sketching to visualisation

Drawing something may indisputably characterise to be the most recognisable behaviour in design activity. Cross (2006: 55) acknowledges that designers begin to draw simply because a design outcome expects one or multiple visualisations of the design. In fact, the meaning of drawing not only represents a result of the design but a tool to assist designers in thinking throughout the entire design process.

Sketching is indicated as a medium allowing designers to initiate conversations with themselves (Cross 2006; Lawson 2005). To be more specific, it is a continuous dialogue that flows between their internal thoughts and external expressions virtually the entire design process. Both Cross (2006: 108) and Lawson (2005: 281) have explained the importance of 'dialectics of sketching' by referring Goldschmidt's (1991) assertion: sketches enable designers to negotiate between 'seeing that' and 'seeing as'. So to speak, as an effective tool to provoke creativity, sketches facilitate the ideation process for designers to reflect criticism and reinterpret it to a new design solution.

To begin a design process, designers draw out their rough ideas on some papers to build the design solutions. The act of sketching enables designers to realise their abstract thoughts and obtain an object to start working with. The architectural engineer Santiago Calatrava once described to Lawson (2005: 278) that his design sketching process is like a dialogue started from the scratch, gradually developed and added up layers of design features and structured while drawing. It is simply easier for designers to reflect their thoughts with imagined sketches even just a scribble.

Correspondingly, Calatrava's expression of sketching dialogue has also been discussed in Cross' research. Besides, several designers' utilisations of sketching such as 'potty drawings' for thoughts organising or 'thumbnail sketches' for ideas criticising were genuinely described in the book (Cross 2006: 55-57). Cross identifies that quick and simple sketching not only works as the most accessible tool for designers to facilitate their thought process but also works as a means to 'handle different levels of abstraction simultaneously'. This is evident in an architecture drawing that various aspects such as plans, sections, and details are drawn together and consider into account at once. Sketching allows designers to compile the elements altogether and revise their ideas based on critics receiving progressively until the final drawing.

In the same vein, an abundant amount of descriptions on designer's visualising skill have been discussed in the DLLs' reports. The DLLs seem to agree on the advantage of visualisation is determined by its strong communicating competence in transforming the abstract content into visible forms. Unlike the design literature, the skill seems to be mostly scouted for communicating with others rather than designers' inner thinking process based on the DLLs' reports. The four DLLs have all highlighted the importance of visual tools on account of their effectiveness to facilitate communications among diverse stakeholders in the design process (McNabola et al. 2013: 25; Bason & Christiansen 2013: 12; Dragoman et al. 2013: 49; Boyer et al. 2011: 326).

In the DLLs' reports, there are two main strengths identified that inseparably contribute to the competence of visualisation in communicating. The first key attribute is that visualisation concretises abstract insights in a form allows the team to interact with the ideas; meanwhile, it translates a complex set of structures and systems into a simpler language. The visible and simplified diagrams avoid the sophisticated words and numbers in order to convey information rapidly and establish a shared understanding among disparate individuals. For example, the Design Council describes the process of engaging citizens and experts to participate in the discussion has become much more accessible after making the new ideas tangible and explicit (Cottam & Leadbeater 2004: 29). That is to say, the visualised ideas not only offer participants clear and mutual perception on the issue but also encourage participants to speculate about solutions collaboratively.

Another benefit appears to be visualisation's informative property. The knowledge or messages interpreted in visuals allow designers to display their reflections upon problem investigations. The Helsinki Design Lab argues that visualisations act 'as a form of analysis rather than illustration just for prettying up ideas' (Boyer et al. 2011: 48). This strength can be noticed in cases

of some visual approaches. Visual tools that included the user journey, service blueprint, and storyboard that map out user behaviour and interactions between users and system are effective visual tools for service development. These visual artefacts enable designers to recognise where disrupted spots in the service require improvements; moreover, they explicitly display which divisions are relevant to engage in cooperation. As noted by the Design Council, visualisation skills can be beneficial for policymaking on account of its capability of facilitating multidisciplinary teamwork (McNabola et al. 2013: 60). Visualisation functions as a powerful tool for the designer to unify divergent opinions into a consensus among different groups throughout the process.



Narrative

Representations can also appear as words, verbal descriptions or even a storytelling besides graphical drawings. Although the textual record is often neglected during the design process, narratives have the virtually analogous impact as sketches. According to Lawson (2005: 270), the combination of words and drawings are two essences in design thinking. Narratives function as a means not only to prompt solutions but also to leave room for people to interpret ideas on their own.

Firstly, the verbal narratives contain some important features that inspire further ideation. As evidence of this, Lawson (2005: 273) has cited Cross' protocol study about a mountain bike's backpack carrying device design case. This study described there was a moment of a 'creative leap' which was prompted by words (Cross 2006: 66-70). The design team immediately arrived at a consensus for concept development when some key words were spoken out. Unlike graphical images, the utilisations of narratives process concepts in words that contain a complex set of characteristics offer a direction for emerging solutions and thus represent a powerful design skill for designers.

Another reason for applying textual descriptions in the design process is the flexibility of the words in comparison with images. As Lawson argues (2005: 272-273): 'the verbal description allows people to interpret shades of meaning not allowed by drawing.' In the design process, some experienced designers tend to provide verbal narratives when presenting ideas to their clients in order to prevent prejudices. For example, a world leading product designer Richard Seymour once submitted a narrative proposal to British Rail (Lawson 2005: 272-273). Instead of showing a graphical drawing to his clients, he proposed a narrative describing his design as a style of 'heroic' that children would dream about becoming a driver for this train. In Seymour's case, the

description of heroic legend performs as a powerful tool to convey his idea to the rail company. That is to say, the narrative offers some promising aspects of the concept without restricting people's interpretation.

Owing to two attributes mentioned, the utilisation of narratives seems resonant among the DLLs. To be more specific, the DLLs employ narratives as a tool to display the findings of design research. This can be seen in the design process of MindLab, who collected and spread citizen's real-life stories to enable the design team and the clients to understand the real problems within systems currently in use (Mindlab 2011: 17-18). In addition to stories, persona could be another way to apply narrative for facilitating the design process. As discussed by the Public Policy Lab, persona presents fictitious characters that offer genuine insights from the representative types of intended users in which helps the designer to identify the challenges and design a feasible solution (Dragoman et al. 2013: 43). An informative narrative could efficiently communicate the insights of design investigations in a form that effectively creates empathy and inspires solutions for project participants.

Prototyping to test

Prototypes perform as a rather high-fidelity representation of the design among sketches and narratives. Similar to other representations that are created to examine the design ideas, prototypes provide opportunities for future use simulation that allow designers to review the design more detailed and test its performance in reality. In addition, prototyping seems to play a pivotal role in managing risks for designers and therefore is regarded as an indispensable tool in design activity.

Displaying most features of the design, prototype investigations enable designers to improve their designs based on evidence. Whether detecting hidden flaws to revise or discovering potential advantages to inspire that allowed by the prototype, both progress the design development forward. A useful example of prototyping is a city car design case (Cross 2011: 44-47). Although the design team has generated countless sketches and experiments with existing cars, Cross described the design process did not obtain any significant breakthrough until built a real scale prototype. A more cost-effective idea regarding space arrangement arose after exploring a full-size prototype that corrected the team's biased assumption. That is to say, a prototype facilitates the process of reconciling what is imagining and what can be accomplished, and avoids some hidden mistakes that were unable to discover with graphical media.



Similarly, Lawson seems to draw more attention to the activity of testing. Although Lawson has not treated the act of testing in much detail, there are few implications for testing as one of the stages in the design process could be recognised when he described some expert designers' cases. This is exemplified in his book that several well-known architects argue that a good design should be tested if it satisfies the requirements, rather not to pursue originality of appearances (Lawson 2005: 153). Testing is one of the fundamental activities in design and an evolutionary stage for subsequent modifications (Lawson 2005: 198). Based on testing results, the designer can investigate the workability and satisfaction of the idea in a real context and then revise it. Taken together, the evidence indicates the necessity of including the phase of testing in design activity.

While prototyping allows designers to examine and explore their ideas tangible in order to eliminate unanticipated defects and inspire further innovative solutions (Cross 2011: 44-47); testing assists designers in probing the consequence of the design solution in life circumstances (Lawson 2005: 198). Due to the above advantages, the effectiveness of prototyping and testing has been heavily highlighted in the DLLs' cases. However, the DLLs seem to consider prototyping and testing as a rather agile, simple and cheap form to examine the proposition in contrast to the scholars' original emphases on creating highly resembling prototype.

Risk mitigation appears to be the major advantage of quick prototyping and empirical testing. In this regard, the DLLs argue that prototyping should begin at the early design stage in order to test out the performance of the new solution in the life situation (cf. Boyer et al. 2011: 327; McNabola et al. 2013: 7). Various types of prototyping techniques including modelling, role-playing, scenario creating can be utilised to test the design with the project participants. Once the designed solution is prototyped and tested, it 'allow[ed] the designers to quickly and cheaply see what works for the user and what does not and then make improvement' (McNabola et al. 2013: 20). On the one hand, the feedback received from the testing allows the designer to consider the impact for the future users and detect the hidden failings within the new solution. On the other hand, this quick and simple prototype allows the designer to keep the design process agile so that enables multiple rounds of idea testing. As a result, the design solution can be gradually shaped based on real-life requirements and risks can be efficiently reduced before implementing the new design into the real world. In order to develop a new concept, a continuous small-scale prototype testing performs as a rather secure means that leaves more opportunities for further improvements in comparison to hurry and launch expensive pilots that required huge resource commitment.

2.4.4 NEW DESIGN CAPABILITIES

This section introduces a new set of design capabilities emerging in the DLLs' reports that have not covered by the research of Lawson and Cross. The DLLs draw extensive attention to "user-centricity" and subsequently building up the capabilities of "creating professional empathy", "co-design" and "co-production". In addition, the capabilities of "facilitation" and "stewardship" were fostered to enable an efficient design process.

2.4.4.1

User-centricity

The examined DLLs' reports in this study provide a significant cluster of shifting the users' role to the essence of the design process. People-centred, human-centred, user-centred, and user-led, such words are prevalently written in the DLLs' reports that all points to the same implication of developing the project by placing the people's aspirations as priority in order to generate a desirable design output at the end (cf. Design Council 2015; Bason & Christiansen 2013; Kottamasu et al. 2013; Boyer et al. 2013). To refer to this concern to the people or so-called user, this paper adopts the term "user-centricity" hereafter.

The successful user-centred design builds its foundation on a sincere understanding of people's demand, thereby enabling a tangible response to their requirements or even unspoken aspirations. On this point, the Design Council argues that the users are 'the biggest untapped resources' in the design process (Cottam & Leadbeater 2004: 16). Their needs and wishes are the potent inspirational source for new designs; nevertheless, the influence of users seems to be widely underestimated and neglected in the traditional way of delivering services. In order to improve current public services, the DLLs follows the user-centred approach and explores new methods to engage their users, which mostly indicate citizens in their cases, in the design process. The ethnographic research, professional empathy, and co-creation workshop are methods that enable the designer an in-depth insight of their targeted users in real context. Those methods assist the designer in discovering and incorporating the future users' opinions during the development of new ideas. In addition, the use-centred approach would have more possibilities to establish the particular emotional-attached relationship between the new service and citizens through a series of user-engaging design activities (Bason 2013: 12). Hence, it largely raises the chance to success the new service. The following section will further introduce the user-centred methods that are applied by the DLLs in detail.

2.4.4.1.1

Professional empathy

Empathy is the ability to understand and experience the feeling of others, whereas professional empathy employed as an influential design method that enables designers to apply the users' lens to examine current scenes and speculates on their likely reactions while conducting design research. To date, the DLLs seem to emphasise further the designer's competence in creating professional empathy for the team who has no chance of being at the scene personally. In other words, the designer fosters empathy for others in order to enable them to capture users' feelings and experience their frustrations in the situation and thereby ensure a new solution is human-centred, developed according to people's concerns.

Empathy seems to be the key to triggering real changes. Accordingly, designers utilise a set of design techniques to spread the professional empathy among the major stakeholders that guide them to perceive the issue differently for creating a sense of the necessity for changes. In this regard, persona, shadowing, and video recording can be employed as powerful tools for conveying the lively experiences of the users that open the project participants' eyes. As Christian Bason (2012: 27), the former director of MindLab, acknowledges, 'this is what I call "professional empathy": The discipline of putting yourself in someone else's situation, to explore how they experience what your organisation does to them.' This is exemplified in the work undertaken by MindLab (2011: 17-18) who has several times repeated the effectiveness of the citizens' stories facilitates their design processes. The specific real stories collected from the ethnographic research endeavours successfully switched the organisations' mindset to citizen-oriented when generating new ideas. In other words, empathic design breaks organisational barriers and bridges the institutions with the ordinary people's everyday life experiences and consequently urges them to take actions on the issues. Spreading empathic understanding eases the obstacles between the phases of execution and implementation among the multiple project stakeholders, thereby increasing the opportunities for success.

2.4.4.1.2

Co-creation approach: co-design and co-production

There seems a consensus among the DLLs that the co-creation method is suggested to be the most active approach to respond to the increasing attention of the end user of the service in the design process. The Design Council discusses that the co-creative design process meant to engage citizens by supporting them to take actions themselves in developing new public services and thereby creating 'a set of the new relationships between citizens, workers and professionals' (Cottam & Leadbeater 2004: 1). The designer in this process utilises a combination of design techniques to intentionally involve future users in the design progress for the purpose of allowing them to interact with the solution ideas. In addition, the process empowers the intended users to articulate their exact expectations and demands upon the new services. That is to say, the co-creative way of delivering a new service presents no longer a single but rather a double way of communicating between the designers, service providers, and users to effectively create the desirable outcome. Regarding these benefits, the applications of a co-creation approach can be further distinguished when it is practised in co-designing or co-producing.

Co-design: empowerment

The co-design approach invites disparate stakeholders to the same workshop to express their opinions; meanwhile, it acquires information about the new service. The co-design workshop, which is facilitated by designers, creates a new and neutral channel to involve key stakeholders participating proactively in the development of the service rather than act only as research subjects. Moreover, it is a continuous process of user involvement that includes the future users in different stages of the design. As the Public Policy Lab states: 'a co-design approach more intensively involve[s] members of the public and front-line service providers in research, prototyping, testing and implementation of services to be administered by public agencies' (Dragoman et al. 2013: 18).

Based on the DLLs reports, there are two reasons for the adoption of co-design approach. Firstly, it is a continuous process of user involvement that cements the users' emotional engagement with the new plan. Commenting on co-design, MindLab acknowledges that the act of empowering the future users to join the design discussion is a tactic to win their trust (Bason & Christiansen 2013: 25). A series of co-design exercises are not only about empowerment but also spreading empathy for the establishment of the durable relationship with the future owners of the service. The deep engagement between the user

and the new plan will ease the difficulties in the later phase of implementation. In other words, co-designing assists the designer in increasing chances for success the final outcome.

Secondly, following the co-design process enables designers to collect genuine requirements of the design. In the case of designing the housing service for the city of New York, the Public Policy Lab described the co-design approach as a combination of design techniques and workshop exercises that enables collaborative sessions between designers and key stakeholders in identifying the difficulties and constraints of the project together (Dragoman et al. 2013: 9). To be more specific, the participatory session offers the intended user a chance to review the finding of ethnographic research and comment on it. These authentic insights of the users are important inspiration sources can, therefore, be gathered by designers for further design developments.

Co-production: sharing ownership

Co-production encourages future users to jointly produce a design to ensure that the outcomes will be tailored to their actual wishes and demands. MindLab and the Design Council have both argued that designing systems in this manner allows the public to participate in the planning phase, inducing members of the public to perceive themselves as co-producers of their own services (Cottam & Leadbeater 2004: 16; Bason et al. 2013: 6-7). The process of involving the users in the phases of planning, prototyping and piloting sounds like a critical design strategy for achieving an impactful result.

Instead of delivering services in the traditional way (structuring top-down delivery), the co-production approach returns ownership to the users and allows them to participate in decision-making. In the case of designing a housing service, the Public Policy Lab proposed the co-production process as a means to obtain citizens' commitment to the new service before it is implemented to real scale (Dragoman et al. 2013: 20). As traditional users, they were obliged to accept any public services delivered to them. With a set of design tools that included visual diagrams, scenarios, storyboards and facilitation skills, the users would be empowered to play an active role in proposing potential solutions based on their insights and experiences. Meanwhile, the designer would not only act in a supportive capacity to guide workshop participants to generate ideas but would also stay in the design position, integrating and synthesising ideas that emerged from co-production workshops to produce more satisfying services. As a result, the proposed solutions would be able to respond meaningfully to the lived situations. Moreover, switching the users' role to involvement in the core of the planning phase and the design of their own services would result in the greater likelihood of their commitment to the implementation.

2.4.4.2 Stewardship

The most common risk in any design activity probably occurs when the proposal remains at the envisaging stage rather than implementation stage in the reality. In order to ensure the design proposition to be realised, the Helsinki Design Lab suggests that the capability of stewardship allows designers to bridge the plan and the implementation (Boyer et al. 2013: 15). Similarly, the MindLab indicates that stewardship guides designers to manage the plan in line with practicalities to guarantee it taken into actions (Bason & Christiansen 2013: 33). In other words, designers' exceptional ability for stewardship plays a critical role to achieve the project goal.

The design will mostly succeed if the designer acts as an eligible steward to guard the ideas practising in real life. According to the Helsinki Design Lab, it is arduous for designers to introduce a new idea to an occasion that has been occupied by an inherently dominant culture for decades (Boyer et al. 2013: 20). While collaborating with public sectors, the job of delivering a new service becomes more intricate since it involves the task of coordinating diverse silo expertise to eliminate bias against new ideas and form an approval for changes. In other words, the designer proactively leads the project and minimises the risk of distractions for the team. This is evident in the case of integrating the digital services of the British government, in which the design lead stewarded the project to ensure that the design team was able to employ their preferred tools regarding web operating systems, and avoid unnecessary disturbances to meet their ambitions (Boyer et al. 2013: 125).

The design lead conducted considerable negotiations with outside stakeholders in order to achieve an optimal design process. In this case, the stewarded project successfully derived the approval for the team to utilise alternative IT systems instead of the one currently in use, which has been in operation since the last century. The consequence of the switch in systems has been validated to be cheaper and more efficient condition to redesign the digital service. This example presented thus far supports the idea that in order to work with governmental institutions, the designer should possess the capability to steward so as to handle bureaucratic issues involved in the design process and thereby to ensure that ideas are implemented into substantial action.

2.4.4.3 Facilitation

While situating in a massive complex world, designing a good service seems to require supports across diverse disciplinary expertise. Instead of demanding designers to learn various types of knowledge, building up the team comprises representatives of the respective professionals could be an alternative way which appears to be more beneficial. As a result, the designer is obligated to play a role as a facilitator to assist a multidisciplinary team in collaboratively working for the shared goals.

The designer as a facilitator has been frequently brought up in the DLL's reports, and their reports could classify the purpose of facilitation into collaboratively creating and evaluating new ideas. In this regard, MindLab acknowledges that a facilitating skill is imperative when inviting a group of diverse background stakeholders into the same table for the inputs of project knowledge and ideation discussion (Bason 2013: 12). A broader perspective has been adopted by the Public Policy Lab, who draws the attention to the process of testing and reporting that designers are obligated to facilitate the process of involving users with the concept testing workshops (Dragoman et al. 2013: 20). Collectively, these opinions outline a critical role for the designer– act like a facilitator to coordinate conversations between different groups of individuals to share their knowledge openly with each other.

Visualisations, scenarios, storyboards or prototypes are various design techniques that are employed to facilitate collaborations between diverse stakeholders. According to the Design Council, designers eliminate barriers amidst silo expertise and persuade them to embrace the new ideas through a series of workshops that facilitated by a set of design tool to ensure the real changes (McNabola et al. 2013: 19). The design techniques assist designers in building the neutral place that allows conversations to continue among experts from different fields or between expertise and users. To be more specific, the design processes that included brainstorming and prototype testing are coordinated in a manner that empowers stakeholders to participate and contribute their insights to the solution developments. Under the circumstances, designers switch to rather a supportive role in the design process, and meantime they also navigate the track proceed toward the direction to the overall goals of the project.

03

DISCUSSION &
CONCLUSION

3.1 WHAT DO THE DLLS MEAN BY DESIGN

This master's thesis explored the notion of design in the emergent field of design for the public sector against the body of work by Bryan Lawson (2004, 2005) and Nigel Cross (2006, 2011), which would arguably cover what design means in its subfield of industrial design and architecture. The body of data includes 23 reports from four design-led labs (DLLs) that maintain different funding structures and different relationships with their respective governments. Through thematic analysis, the study identified the notions of design depicted by the two scholars and DLLs by recognising the similarities and discrepancies between them. The breakdown of the analysis derived from the overlapping, extended, emergent notions of design in terms of tendencies, capabilities, and skills (See Table 10). To illustrate this, Figure 11 summarises the findings of design components that have been described by the DLLs and demonstrates each component with different sizes according to the levels of emphases expressing in the DLLs' reports. The most notable finding emerging from the analysis might be that the four extended design capability and design skills, as well as a new set of design capabilities, may contribute to the process of expanding the notions of design adapted for the public sector to improve service provision and policymaking.

The analysis demonstrates the few key points that deserve attention. First, the reports from the DLLs rarely deal with design tendencies in comparison with the landmark books of the two scholars. Apart from the *iterative cycle*, the DLLs virtually disregard *the peculiarity of the design problem*, *solution-oriented mindset*, *entwined nature of problem and solution spaces* and *abductive reasoning*, while they were densely illustrated in the books by Lawson and Cross. In other words, the DLLs have not discussed why design operates in certain manners with much detail but only featured iteration as a rather practical approach to mitigate the risks of failure in their design processes. Together the four DLLs highlight the necessity of iterative rounds of design explorations and refinements so as to guarantee their propositions to be feasible in reality (Bason et al. 2013: 33; McNabola et al. 2013: 7; Kottamasu et al. 2013: 65; Boyer et al. 2011: 329).

Design capabilities and skills were evenly maintained by the two design scholars and DLLs. The capabilities of the *reconstruction of briefs*, *thinking integration*, and *coping with uncertainty* are enabled by the set of design skills including *creating representations of design in variant forms*, *observing*

Table 10 – Revisit the overview of the whole dataset

MAIN-THEMES	SUB-THEMES	Bryan Lawson: How designers think (2005), What designer know (2004)	Nigel Cross: Designarily way of knowing (2006), Design thinking (2011)	Design Council (UK)	MindLab (DK)	Public Policy Lab (US)	Strategic Design Unit of SITRA (Helsinki Design Lab, FI)
1. DESIGN TENDENCIES	Peculiarity of design problem	●	○	○		○	○
	Abductive reasoning	○	○				
	Solution-oriented	○	●			○	○
	Co-evolve problem & solution	●	○				○
	Iterative cycle	○	●	○	○	●	●
2. DESIGN CAPABILITIES	Reconstruction of briefs	●	●	●	○		●
	Integration	●	○	★	★	★	★
	Coping with uncertainty	○	○				○
3. DESIGN SKILLS	Observation		○	★	★	★	★
	Imaginative thinking	○	○	○			○
	Representation	●	●	●	●	●	●
	- visualisation	●	●	★	★	★	★
	- narrative	●	○	○	○	○	○
- prototyping to test	○	○	★	★	★	★	
4. NEW DESIGN CAPABILITIES	User-centricity			●	●	●	●
	- professional empathy			○	○		●
	- co-design			●	●	●	●
	- co-production			●	●	●	○
	Stewardship			○	○		●
	Facilitation			●	○	○	●

LEGEND — Not present ○ Present (1-5)
 ★ Extended ● Frequent (>5)

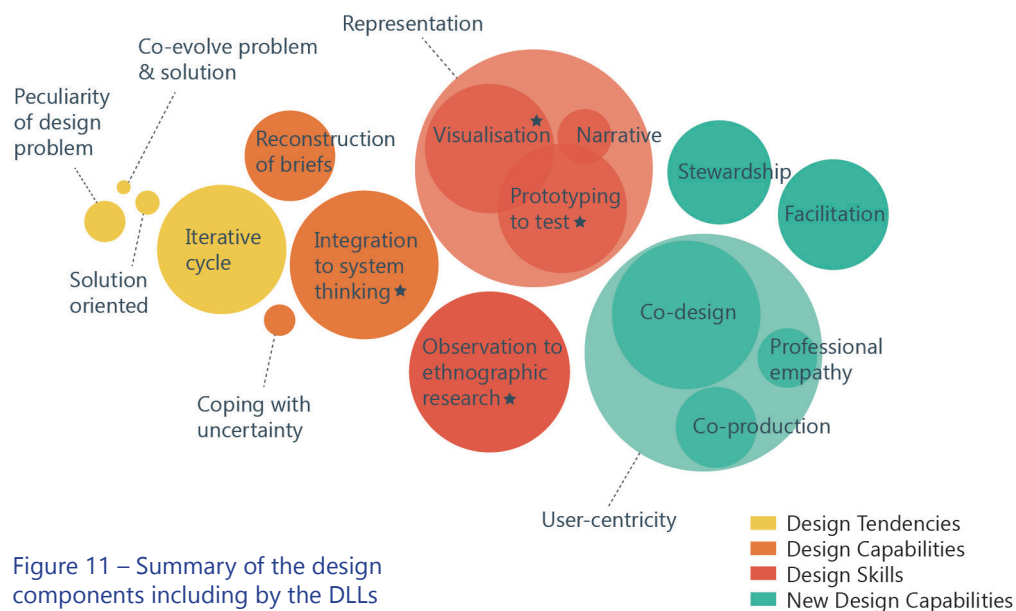


Figure 11 – Summary of the design components including by the DLLs

for identifying problems, and being imaginative. Accounting for a substantial amount of clarifications in the design literature, those capabilities and skills present the core value of design and explain the role of a professional designer. These design competences were presented whether directly emphasised or indirectly illustrated in the DLLs’ reports; therefore, it is evident that the DLLs adopt those capabilities and skills as their competences to improve public service provision and policymaking.

It is noteworthy that the reports from these DLLs present emergent competences, in which I clustered under “New Design Capabilities”. The interesting aspect of this is that Lawson’s and Cross’ books have not covered those at all. As illustrated in Table 10, the four DLLs drew extensive attention to *user-centricity*. The focus of user centricity demands the designer to build up new capabilities of *creating professional empathy, empowering users to illustrate their needs, and returning the ownership of design to users*. This indicates that the role of users has been expanded in the DLLs’ practices, and various design capabilities have been accordingly nurtured for this concern.

In addition to user-centricity, the aim of enabling tangible changes also resonates among the DLLs. They foster *facilitation and stewardship* as important design capabilities to steer the design process and ensure actual implementation of the design proposals. Subsequently, there are four design

capability and skills in Lawson and Cross of which notions have identified being expanding by the DLLs in order to adapt for the use in the public sector. They are, *integration is extended to system thinking; observation is extended to ethnographic research; sketching is extended to visualisation, and prototype to user testing*. Although these capabilities and skills can be found repetitively in the design literature, they have been elaborated and furthered by the DLLs. To be more specific, the DLLs employ ethnography to study the future users; system thinking to remark the holistic picture and integrate the seemingly unrelated parts; visualisation to facilitate the co-design process, and agile user testing to mitigate the risk in implementation.

3.2 BENEFITS OF EMPLOYING NEW DESIGN CAPABILITIES: REFRAMING PROBLEMS, WORKING WITH CITIZENS, AND COST MANAGEMENT

The design-led labs (DLLs) foster design approaches for leading changes and innovation in government for better public service provision and policymaking. From their reports three main design approaches were identified, which, the DLLs argue, would benefit the public sector.

The first benefit is reframing the ill-defined problems confronted by the public sectors. Such thinking requires a full understand of the problem before starting to craft a solution due to the constant uncertainty around the problem (Boyer, Cook and Steinberg 2011). The Strategic Design Unit of the Finnish Innovation Fund, SITRA has named this approach ‘strategic design’ and emphasised it as a new capability for 21st century governments (Boyer, Cook and Steinberg 2011: 87). This resonates with *the reconstruction of briefs and integration* from Lawson and Cross, but extended and reinforced by *systems thinking*.

The second benefit is that design can re-initiate the relationship between the public sector and citizens through the user-centred focus and methods. According to Hill (2012: 21-22), the failure of public policy and services mainly results from ‘a breakdown between policy, the intended design, and delivery, the outcome.’ In this regard, the Public Policy Lab suggests co-design workshops, interview sessions, and user testing, which offer citizens an opportunity to reveal their true thoughts and enable the public managers to understand people’s genuine needs (Dragoman et al. 2013). Those design

activities allow ideas to become more realistic, close the gap between theory and practice, and thereby improve the link between planning and delivery so as to seamlessly implement new public services into citizens' everyday lives (MindLab 2013).

The final, but not the least, benefit of adopting design is cost reduction. One example can be taken from the Design Council, which has saved money for the National Health Service (NHS). The task was to reduce violence that occurs at the Accident and Emergency department (A&E) of hospitals. The design council first conducted fieldwork observing and analysing triggers for aggression in the A&E departments. The insights derived from the observations were important sources for ideation, and the created solutions were then further tested in reality at the prototype stage. The final solution decreased violent behaviour towards the hospital emergency personnel, largely reducing the cost for NHS generating 300% return on investment, which originally cost €81 million annually for NHS (Design Council 2013, 2015).

In summary, the DLLs adopted the design approaches for delivering better service with a lower budget, solving insoluble complex societal challenges, reconciling conflictions between what is wished from citizens and what can be achieved by government. With those benefits proposed, the design approach obtains increasing attention from public managers, and thereby its competences seem to have been gradually acquired by governments internationally.

3.3 LIMITATIONS

One potential limitation of this thesis is that the scope of design literature may not be broad enough to cover the DLLs' design practices. As the DLLs mostly intend to focus on reforming public service and policy, their work is reasonably linked to the field of service design. Nevertheless, considering that service design is a rather young and developing field of study in the history of design research, I was afraid of not being able to complete an inclusive literature review on such field. Also, given the limited timeframe of this master's thesis, Lawson's and Cross' research was chosen as the lenses to examine the DLLs' practices with an attempt to effectively provide a comprehensive view about the study of design on the grounds of its authority in the discipline. While the DLLs pay particular attention to service design, Lawson's and Cross' research works were conducted in the field of architecture and engineering/industrial

design. The issue of emphases on different fields indicates the limitations in the breadth of design literature and consequently leads to a potential deviated research outcome.

In addition, the DLLs' reporting style might not appear objective but normative. The analysed DLLs' reports in this thesis were mainly online sources that derived from those practitioners' websites. On account of the particular focus on government cooperation, the reports might be written to target not the design community but public servants and policymakers. In this regard, the illustrations of the DLLs' design practices could be written from the perspectives of civil servants and communicated in a form that attracts their attention so as to offer a quick insight of what design can deliver for them. That is to say, the texts being analysed in the reports might not be as objective as the literature and thereby become the second research limitation in the thesis.

The last possible limitation would be my previous educational encounters. On the one hand, the course of Design for Government, taken before this thesis began, has provided me knowledge about some of the DLLs. This preliminary understanding of design regarding DLLs might have an impact on recognising with the notions of design while reading the two scholars' books. On the other hand, I have not been exposed much to design literature in past years; however, my previous design training and practices as an industrial designer might also contribute to identifying what appears to be relevant regarding defining design during the process of thematic analysis in the literature as well as DLLs reports. As a result, the outcome of analysis that requires interpretive work might be influenced by my personal experience.

The aforementioned limitations proposed topics for future works. Despite these, I would consider this thesis to be a starting point for establishing the definitive knowledge of design adapted for the public sector as an approach for improving public service provision and policymaking. In respect of the issue of selecting the scope of data, a further study could be suggested to include and delve into more specific disciplines of design theory such as service design, user-centred design, design management, etc. with the base of this study.

3.4 IMPLICATION FOR DESIGN EDUCATION

Reflecting on the findings of the study, the new design capabilities emerging from the analysis of DLLs' reports may imply the demand of expanding the scope of design curriculum. The awareness of employing the user-centricity approaches that included co-design, co-production, and ethnographic research have been well established among designers and design education. However, some of the design competences emphasised by the DLLs, system thinking, facilitation, and stewardship, seem to have remained unnoticed by the design education system. This can be seen on reflection in my own undergraduate background in industrial design 10 years ago. The aforementioned design competences were completely ignored in my training as a designer. To date, studying at Aalto University, courses such as "system thinking", "participatory methods and facilitation skills", and "creative cooperation methods and skills" are available in the Creative Sustainability master programme. The programme attempts to extend its course portfolio by offering courses beyond the traditional design courses that seem to respond to the DLLs' emphasis of the new design competences. Nevertheless, these courses represent a rather small number in the current programme of study. It seems that the importance of such skills has not yet become resonant among most design education. Perhaps, the DLLs' cases could shed light on the necessity of including those new design competences into the design curriculum.

3.5 THE ROLE OF USER: TRANSFORMATION FROM PASSIVE RECEIVER TO ACTIVE CO-PRODUCER

There seems to be a strong consensus among the design-led labs (DLLs) that they place the user's need at the centre of service delivery process. The user here refers to the citizen in the contexts of respective DLLs. As discussed in the previous section, the emergent design capability, "user-centricity", represents a fresh perspective in contrast to how users are (or are not) depicted by Lawson and Cross. Furthermore, the analysis reveals that various design competencies have been developed for engaging users throughout the design process. The DLLs explored different ways to study their users, empower them to share their unspoken desires and enable them to participate in the design process collaboratively. As noted by the Design Council, users are 'the biggest untapped resources' when reforming services (Cottam & Leadbeater

2004: 16). It seems evident that the role of a user has been transformed from a passive service receiver to an active co-producer in the DLLs' practices.

Although Lawson (2005: 85-87, 168-170) has mentioned user involvement, the users were depicted as the least influential player in the design process owing to their remoteness to the design process. In fact, Lawson (2005: 85-87) implies that designers might not have formal access to their users after all. That is to say, the role of users were somewhat noticed but, there had been no clear approach to tackle this issue existing yet. Indeed, today such methods are being prosperously developed and adopted by the DLLs to enable the designer to engage the users or stakeholders to the design process, as core design competences to deliver better public service provision and policymaking.

3.6 A MINDSET FOR CIVIL SERVANTS: USER-CENTRICITY

The user-centred approach has the advantage of tailoring the design outcome to respond to the users' aspirations regardless of the applied fields. As the four DLLs illustrates the importance of user-centricity in reforming public services that intend to engage the future users in the design process, one may doubt who would be eligible to represent the majority since it is virtually impossible to invite every citizen to design together. This is especially when there is no clear illustration about the criteria for user selection in the DLLs' reports. It is reasonable to argue if the co-design process maintains equity among citizens when the process receives disparate opinions from selective representations.

However, it seems that the effectiveness of the user-centred approach has actually more influence on initiating a new mindset for civil servants which is an attempt to develop services according to citizens' needs and the co-design approach appears to be one of the alternatives. Regardless of the possibly biased opinions from participating citizens, an act of co-designing offers civil servants who might not have access or opportunities the chance to closely review how current system is utilised in order to correct their pre-assumptions or prejudgements. A user-centred mindset for civil servants enables a more inclusive public service for citizens.

04

REFERENCE
AND APPENDIX

4.1 REFERENCE LIST

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4.2 APPENDIX

The table below demonstrates the structure of the quote matrix derived from the analysis of the entire dataset, and the direct quotes in each section can be found with the same number labelled in the following pages.

CODES (SUB-THEMES)	Bryan Lawson: How designers think (2005), What designer know (2004)	Nigel Cross: Designerly way of knowing (2006), Design thinking (2011)	Design Council (UK)	MindLab (DK)	Public Policy Lab (US)	Strategic Design Unit of SITRA (Helsinki Design Lab, FI)
Peculiarity of design problem	1	2	3		4	5
Abductive reasoning	6	7				
Solution-oriented	8	9			10	11
Co-evolve problem & solution	12	13				14
Iterative cycle	15	16	17	18	19	20
Reconstruction of briefs	21	22	23	24		25
Integration	26	27	28	29	30	31
Coping with uncertainty	32	33				34
Observation		35	36	37	38	39
Imaginative thinking	40	41	42			43
Representation						
-visualisation	44	45	46	47	48	49
-narrative	50	51	52	53	54	55
-prototyping to test	56	57	58	59	60	61
User-centricity			62	64	64	65
- professional empathy			66	67		68
- co-design			69	70	71	72
- co-production			73	74	75	76
Stewardship			77	78		79
Facilitation			80	81	82	83

1

...design problems are built up of constraints which may be either entirely internal to the system or object being designed, or may be linked with some external factor not under the designer's control. These constraints may be imposed most obviously by the client or users but also by legislators and, even, designers. pp.99

...it is important to recognise the different contributions to the problem made by each of the major generators of constraints... As we have seen the legislator's demand is fixed.

Legislators pp.89

Legislators may not involve in actual design itself but create constraints within which designers must work. Such legislation and control may range from standards and codes of practice to guidelines and recommendations.

Designer has a reputation which is largely the result of past work and is thus anxious to continue developing a coherent body of work for all to see.

Designer too is expected to generate constraints.... It is obvious that these designer-generated constraints are comparatively flexible. If they cause too many difficulties, or just simply do not work out the designer is free to modify or scrap them altogether.... but designer also has ability to critically evaluate their own self-imposed constraints. pp.91

The designer may think of a new set of constraints altogether. pp.90

Client: The design task, albeit ill-defined, is usually initially generated and expressed by a client. Architect Michel Wilford does not just see client as the source of the brief but as a creative partner in the process... The client then is the most obvious example of a source of design problems and constraints...those constraints can be explored creatively through an interaction between designer and client. It is certainly misleading to think that a client simply presents a designer with a complete brief in which the problem is totally defined and the constraints clearly articulated. The relationship between client and designer itself actually constitutes a significant part of the design process. pp.84-85

Obviously, the client will probably be extensively involved in the process of drawing up the brief, but many designers seem to prefer the continuing involvement of the client throughout the process. In contrast with the image of the designer so often portrayed by the magazines and journals, many designers do indeed enjoy close working relationship with their clients. pp.254-255

Herman Hertzberger tells us that his design process cannot work unless this trust is established and explains this with a catering analogy (Lawson 1994): "If you have not got a good relationship in the human sense with your client, forget it because they'll never trust you. They trust you as long as they have seen things they have eaten before, but as soon as you offer them a dish they have not eaten before you can forget it."

The important lesson for designers reminds us that if we really want to be creative and innovative, then we must first establish confidence in our clients. pp.254-255

Skills and values Involve clients is important and it requires skills of consultation, listening, and explaining. pp.301-302

These constraints may be imposed most obviously by the client or users but also by legislators and, even, designers. pp.99

In fact, clients often find it easier to describe their problems by referring to existing solutions which they know of. This is all very confusing, but it remains one of the many characteristics of de-

sign that is so challenging and interesting to do and study. pp.48

(Guiding principle chapter): One of the characteristics of good designers is that they focus on the client and see the client playing a role in the very design process itself. Certainly a supportive and understanding client can make an enormous difference to the success of project... Robert Venturi: "if the client has faith this can often lead to something... we think architecture has to derive from collaboration and we learn a lot from the client... we get some of our best ideas from clients, we love collaborating with them"...perhaps only the best designers have the confidence to allow their clients into what is a delicate and easily disturbed creative process.

Users are generally more remote from designers than clients. Whilst the designer may be able to interact with a sympathetic and motivated client, there may be no formal access to users at all. pp.86-87 (diagram)

The designer must work to negotiate a solution which meets the relative and disparate sets of criteria which are held, often implicitly, by clients, users and legislators as well as members of the design team. pp.109-110

In a study of architects and their clients, most of the architects argued that they preferred to be involved with the project from the very beginning (Lawson and Pilling 1996)... The architect and interior designer Eva Jiricna tells how, in her experience, "we never, ever get a brief from a client which we can start working on" pp.182-183

Client/designer tension then is inevitable and an integral part of the problem. In those forms of design where clients are not users, an added element of tension is likely not only between the client body and the users, but also between user groups. Indeed in this case it is actually the designer's job to uncover this tension; a process which can make for an uncomfortable life. E.g. working hard to resolve the deep underlying tensions between doctors, nurses and administrator when designing hospitals. pp.237

the client cannot actually design but nevertheless may to some extent know what is wanted and is anxious lest the designer gets quite different ideas.

The client may adjust priorities as the design implications unfold.

"Our job is to give the client not what he wants but what he never even dreamt he wanted... what I have previously said about the client affects the methodology of design (Lasdun 1965) pp.168

The users may well not be around to be consulted.

Even architects commissioned to design new building for large organizations... are likely to be buffered from the actual users by a client committee or even a full-time building department. Frequently communication between designers and their users is both indirect and, as John Page has argued, filtered by organizational politics. Why? pp.86-87 (diagram)

"People barriers"...in local authorities, both the politician and administrators may attempt to establish themselves as the communication channel between the designers and the users outside in order to force through policy or maintain a powerful position in the system. pp.86-87 (diagram)

Zeisel (1984) showed that while there might often be good communications between designers and paying clients, both have a gap in their communication with user clients.

When that client is not even the prospective user of the design, the problem becomes even more remote. This increasing remote-

ness of designers from those for whom they design has created the need for user requirement studies... (in short words) Designers turned to other disciplines and wish them tell what their users actually need. However this liaison between designers and social scientists has not been practically worked because social science remains descriptive but not prescriptive which is needed in design. More, the more genuine collaboration has yet established. pp.86-87 (diagram)

Users are generally more remote from designers than clients. Whilst the designer may be able to interact with a sympathetic and motivated client, there may be no formal access to users at all. pp.86-87 (diagram)

(Guiding principle chapter)Users, however, are all different and likely to make differing demands on the final design. The different kinds of users involved in buildings often makes this extremely complex. In architecture, then, there are sometimes opportunities to involve the users of buildings in the design process.... the Dutch architect Habraken who believed that "the process simply does not work if occupants are not involved"....He advocated the deliberate separation of those parts of the solution which he thought must be determined by the architect from those which he felt must be more capable of being determined by the users. (Habraken 1972) pp.169-170

I have argued elsewhere that legislation often focuses not on what is really desirable but what can easily be measured. It is often therefore framed in such a way as to encode knowledge in a form more likely to be helpful to the regulator than the designer (Lawson, 1975) Lawson, Bryan. (2004), What designers know, Architectural Press publication. pp.24

However, this argument must also mean that each designer or design team is likely to end up solving a different range of problem given the same starting points. We therefore must conclude that design problems depend to a significant extent upon the knowledge brought into the project by the designer. Lawson, Bryan. (2004), What designers know, Architectural Press publication. pp.13

Design process can be smooth when the clients and designers are both able to express their own kinds of knowledge...Clients know what needs to be done. Designers know what can be done...Design then can be seen as transformation between problem needs and requirements on the one hand and solution possibilities on the other. Lawson, Bryan. (2004), What designers know, Architectural Press publication. pp.28

2

Ullman et al. (1988) pointed out only some constraints are "given" in a design problem; other constraints are "introduced" by the designer from domain knowledge, and others are "derived" by the designer during the exploration of particular solution concepts. Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.100

The hydro-pneumatic suspension system was an example of an innovation initiated by a change in regulations which forced Gordon Murrar's thinking onto how to retain the ground-effect advantage. It is an example of radical design innovation. through thinking 'first principles' about the effects of natural forces, and having the motivation to follow through a basic idea into finely-detailed implementation. Cross, Nigel. (2011), Design thinking, Berg. pp.37-39

3

Design principles:

When analysing the research, a series of ten design principles emerged which will guide the design and development of new ideas.

Design principles that have been developed to help guide the creation of solutions.

Underpinning all GDS's work are their ten design principles. In line with their own tenth principle, these were issued online and quickly went viral.

4

Guiding Design Objectives:

Certain guiding objectives, based on design research findings, inform each of the proposals. These design objectives are the glue that holds the knowledge-sharing infrastructure together.

5

In anticipation of the changes coming to the market and eager to maintain their position as an industry leader in orthopedic products, DePuy engaged the HHC to help them rethink knee replacement surgery from first principles.

GDS use a similar approach to the design of GOV.UK by maintaining a set of design principles that have been publically available since the launch of the alpha version of the site. These have been revisited and redefined over time as the team learn more about what works and what does not, but the principles and the fact that they are shared publicly, "set out some rules to guide our thinking and to keep us honest."

I like the way that the Helsinki Design Lab recognises that effective innovation needs a client, and needs to understand the client's needs. In some cases the clients will be paying customers. In others they will be a part of government. Bringing them in upstream makes it more likely that the end result will be used and useful.

6

From our analysis of the nature of design problems it is obvious that, taken as a whole, design is a divergent task. Since design is rarely an optimisation procedure leading to one correct answer, divergent thinking will be required. However, there are likely to be many steps in any design process which themselves convergent tasks...Design clearly involves both convergent and divergent productive thinking and studies of good designers at work have shown that they are able to develop and maintain several lines of thought in parallel (Lawson1993a). pp.140-143

Design is a prescriptive activity:

...design is essentially prescriptive whereas science is predominantly descriptive. Designers do not aim to deal with questions of what is, how and why but, rather, with what might be, could be and should be. pp.123-125

7

Concern how things ought to be. pp.36-38

Employ abductive/ productive/ appositional thinking pp.38

"I believe in intuition. I think that's the difference between a designer and an engineer... I make a distinction between engineers and engineering designers... An engineering designer is just as creative as any other sort of designer." Quoted by Davies, 1985. This emphasis on "intuition" is perhaps a bit surprising... But I think that the concept of "intuition" is a convenient, shorthand word for what really happens in design thinking. The more useful concept that has been used by design researchers in explaining the reasoning processes of designers is that design is abductive... which is the necessary logic of design- the necessary but difficult step from function to form (Roozenburg 1993)... pp.51-54

According to Peirce, "Deduction proves that something must be; induction shows that something actually is operation; abduction suggests that something may be". It is this hypothesising of what may be, the act of producing proposals or conjectures, that is central to designing. Cross, Nigel. (2011), Design thinking, Berg. pp.27

8

The architects learned about the problem through attempts to create solutions rather than through deliberate and separate study of the problem itself. Lawson, pp.44

9

Solution focused. Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.36-37

Solution focusing:

Many studies suggests designers move rapidly to early solution conjectures, and use these conjecture as means of exploring and defining problem-and-solution together, whereas many problem-solvers attempt to define or understand the problem fully before making solution attempts. This difference was observed by Lawson (1979) in his experiment on problem-solving behaviour in which he compared scientists with architects. In particular, designers with specific experience of the problem type tended to approach the design task through solution conjectures, rather than through problem analysis. Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.101

Core features of design ability:

- Resolve ill-defined problems.
- Adopt solution-focusing strategies.

Cross, Nigel (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.38

Mode of problem solving is "solution focused". Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.29

Designer jumps to ideas for solutions before they had fully formulated the problem which reflects that designers are solution-led instead of problem-led. Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.100

Architects:

Propose series of solution to find most desire one. Cross, Nigel. (2006), Designing ways of knowing, Springer-Verlag London Limited. pp.36-38

10

These activities — referred to subsequently in this document as the design research — were formative in nature: the intention

was to gather ideas and insights to inform and inspire design solutions, not to generate quantitative data.

11

Like Sitra, design is also necessarily oriented towards the future, and we hope to learn much from its inherent ability to pull off the artful balancing acts intrinsic to good design.

Whilst strategic design is pragmatically grounded through its focus on generating plausible prototypes of new approaches, systems and services, it is also offers an alternative to the common kind of decision making based on analytics—that today's living conditions are necessarily the determinant of tomorrow's...

12

...you can't start with a brief and (then) design, you have to start designing and briefing simultaneously, because the two activities are completely interrelated (Darke 1978) pp.47

Design process maps revisited ...designers do not separate out the activities of analysis and synthesis into discrete stages as we would expect from the logical steps that we would predicted based on the prescriptive views of the process. Then we found from interview with designers that even briefing may not be a discrete stage but an activity carried on throughout the whole process. pp.254-255

It seems more likely that design is a process in which problem and solution emerge together. Often the problem may not even be fully understood without some some acceptable solution to illustrate it. In fact, clients often find it easier to describe their problems by referring to existing solutions which they know of. This is all very confusing, but it remains one of the many characteristics of design that is so challenging and interesting to do and study. pp.48

Bringing problems and solutions together:

- Problem and solution are inseparable: Frames and primary generator as ways of negotiating between a problem and solution view to bring what can be made.
- No clear order of appearance: solution focused; tackle a design problem by own way of solving; primary generator as a way of getting solution production and more understanding of the problem; selectively framing the situation to be amenable to solution.
- Briefing is a continuous process: the problem formulation aspects of designing which are often influenced by the emerging potential solution.
- Parallel lines of thought: think along parallel lines, deliberately maintain a sense of ambiguity and uncertainty and not to get too concerned to get to a single answer too quickly. Also be able to judge when to drop some of lines. pp.290-301

The process involves finding as well as solving problems. It is clear from our analysis of the nature of design problems that the designer must inevitably expend considerable energy in identifying problems ...design that problems and solutions are seen as emerging together, rather than one following logically upon the other. The process is thus less linear than implied by many of the maps discussed in Chapter 3, but rather more argumentative. pp.123-125

Design problems and design solutions are inexorable interdependent. It is obviously meaningless to study solutions without reference to problems and reverse is equally fruitless. pp.118

Design problems cannot be comprehensively stated. Design problems' objectives and relative priorities are uncertain and quite likely change during the design process as the solution implications begin to emerge. We should not expect a comprehensive and static formulation of design problems but rather they should be seen as in dynamic tension with design solutions. pp.120-121

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Opportunistic:

The directions are taken during the exploration of the design territory are influenced by what is learned along the way, cannot be predicted and established in advance of design activity (problem and solution develop together).

Co-evolution of problem and solution:

Designers tend to use solution conjectures as the means of developing their understanding of the problem. Since "the problem" cannot be fully understood in isolation from consideration of "the solution", it is natural that solution conjectures should be used as a means of helping to explore and understand the problem formulation. This interpretation of design as a co-evolution of solution and problem spaces has also been proposed by others, and has been found by Cross and Dorst (1998) in protocol studies of experienced industrial designers... Their goal is to create a matching problem-solution pair: start exploring [problem space] find a partial structure-> provide designers also with a partial structuring of the [solution space] use implications of the partial structure generate initial ideas transfer the developed partial structure back into the [problem space]... (2006) pp.102

It seems quite normal in design work that there is an ongoing interactive exploration of both the problem and the solution, in the process of development that has been characterised by Dorst and Cross as the "co-evolution" of problem and solution. Cross, Nigel. (2011), Design thinking, Berg. pp.123

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The hunch of a solution inspires new questions about the problem space and that is where the cycle begins again. The picture, as it were, is formed by seeing the dots, the gaps, and the overall relationships between the two in the same way that the human brain senses and makes sense of all simultaneously.

15

Generation of alternatives:

...that these and other designers studied who use the generation of alternatives, often show them to their clients. This seems to become part of the briefing process; a way of drawing more information out of the client about what is really wanted. pp.210

Knowing that design consists of analysis, synthesis and evaluation linked in an iterative cycle will no more enable you to design than knowing the movements of breaststroke will prevent you from sinking in swimming pool. You will just have to put it all together for yourself. pp.40

In thesis interviews it was found that designers could not clearly remember iterations of their process across the boundaries between the phases defined in the standard map, but they could remember clearly moving from one phase to another. pp.259

Reflecting:

Reflection in action: is covered by combining formulation, moving and evaluation.

16

Modal shifts: An aspect of cognitive strategy that emerges from several studies is that, especially during creative periods of conceptual design, designers alternate rapidly in shifts of attention between different aspects of their task, or between different modes of activity. Some studies of student designers have also noted the apparent importance of frequent shifts of attention or activity mode in influencing either the creativity or overall quality of the design concept produced... Cross et al. (1994) suggested that the more successful students were those who showed evidence of rapid alternation between the activity modes (examining-drawing-thinking) (2006) pp.111-112

Generation of alternatives: Either way, it seems that designers are reluctant to abandon early concepts, and to generate ranges of alternatives. This does seem to be in conflict with a more "principled" approach to design, as recommended by design theorists, and even to conflict with the idea that it is the exploration of solution concepts that assists the designer's problem understanding. However, Fricke (1993, 1996) identified successful designers to be those operating a "balanced search" for solution alternatives. To generate the large numbers of alternative solutions means designers were forced to spend time on organising and managing the set of variants, rather than on careful evaluation and modification of the alternatives. Fricke also found that the degree of precision in the problem influenced designers' concept solutions generation. Imprecise assignment leads to more readily preferred solutions; whereas precise problem-framing conducts wider range of concepts generates to find preferred one. pp.106-107

Schön (1988) points out that 'the work of framing is seldom in one burst at the beginning of a design process', this was confirmed in Goel and Pirolli's protocol studies several types of designers "problem structuring" activities not only dominated at the beginning of the design task, but also re-occurred periodically throughout the task". pp.102-103

A designer begins a conceptual design session by analyzing the functional aspects of the problem. As the session progresses, the designer focuses on the three aspects of the function, behavior and structure, and engages in a cycle of analysis, synthesis and evaluation. At the end of stage, the designer's activity is focused on synthesising structure and evaluation the structure's behavior. pp.109-110

Design intelligence involves an intense, reflective interaction with representations of problems and solutions, and an ability to shift easily and rapidly between concrete representations and abstract thought, between doing and thinking. (2011), Design thinking, Berg. pp.136

Gordon's personal design process is based on starting with a quick sketch of a whole idea, which is then developed through many different refinements. He said that, "I do a quick sketch of the whole idea, and then if there's one bit that looks good, instead of rubbing other bits out, I'd put that bit to one side; I'd do it again and expand on the good bit, and drop out the bad bit, and keep doing it, do it; and end up with all these sketches, and eventually you end up throwing ninety percent of these away."

17

Rather than jumping straight to expensive and risky pilots, design process tests iteratively, starting with low-cost, simple prototypes and designing out risk as prototypes become more evolved.

As each prototype reveals more about what works, iterations can become more like a finished product. By the time one arrives at

final prototype or pilot, unintended consequences and risk of failure will usually have been designed out.

18

Building on insights about user experience outside and inside the system, designers then carried out iterative prototyping of web mock ups, testing them with end users.

Qualitative, ethnographically-inspired research; highly open, interactive and tangible workshop formats; visualization and rapid prototyping; user testing redesigned services; these are in many ways novel approaches to policy and service innovation.

Design is rather more predisposed to iterative creation and stewardship, closing the gap between development of the 'plan' and its implementation into 'practice'. Rather than formulating a strategy that is distinct from practical application, it is in the testing and iteration that the plan truly comes to life in relation to context, practical outlook and consequences for people.

Sabine Junginger, Kolding School of Design (DK), illustrated the classic policy process model: First, research, then analysis, then decision, then implementation. However, a design approach would be much more concerned with implementation (experience and impact for end-users) from the outset, and would – in line with Banerjee's point – be driven much more iteratively.

19

Through eight weeks of participatory design research, panels, and user feedback sessions with students and families, SCDC startups deepened their understanding of the challenge, validated their ideas, and pivoted their products to enhance the choice experience. The challenge culminated in the presentation demo products from each developer.

A co-design process is one in which the intended users of a service play a key and repeated role, participating in iterative prototyping and evaluation that helps to tailor responses to their actual needs.

Design:

During this phase, the project team – policymakers, designers, and key service participants – work together to expand on the prompts identified in discovery. Typical design activities include further ideation, rapid prototyping, and testing, all carried out in multiple iterative cycles. The results of a design phase could include refined, production-ready prototypes and plans for pilot testing and evaluation.

Multiple rounds of design, research, creation, presentation, and revision ensured that the informational materials, implementation plans, and related strategies were vetted in full by HPD and received input from other stakeholders.

The processes employed by service designers, including visual documentation techniques, emphasize the iterative cycle of the design process (in contrast to a linear sequence of one-off tasks) and follow a cycle of problem-framing, data gathering and analysis, idea-generation, prototyping, testing, and back to problem-framing.

It's iterative and visual — meaning that multiple rounds of conceptualizations are visualized (or even acted out), then subjected to review and testing in an effort to identify, at low cost and low risk, promising avenues for innovation; this process occurs throughout the design and implementation process.

Specifically, these strategies usually include some combination of design methods – facilitated brainstorming, iterative design and quick prototyping, hands-on user testing – and pilot implementation with ongoing measurement, assessment, and documentation. These strategies engage disparate stakeholders (members of the public, front-line service providers, agency leadership, etc.), help in clarifying these users' needs and motivations, and promote their alignment towards a shared goal.

These multiple rounds of design research, creation, presentation, and revision — known to designers as "iterations" — ensured that the informational materials, implementation plans, and related strategies were vetted in full by HPD and received input from other stakeholders.

The team will follow up with another design iteration cycle with HPD to ensure that the documents reflect insight captured during user testing. By working closely with HPD on this final round of testing and document iteration, it's hoped that HPD will have the design framework and experiential toolset to continue to iterate on the most valuable documents beyond the pilot phase of the project.

The informational-materials pilot requires testing content with users, doing iterative design revisions, participating in training sessions, developing content governance.

20

Although it took six months to establish a working relationship with a reliable potter, manufacturing in a rural village keeps manufacturing costs down, creates a new income stream for the village, and allows The Daily Dump an iterative product design cycle.

UK government, Government Digital Services (GDS) iterated their product with public alpha and beta launches. They continuously blog about their work and they have risen to prominence as one of the most interesting startups in the UK, attracting the recruits to match. The new GOV.UK website is a visible product that sets a precedent and embodies a powerful alternative to the status quo, changing the standard by which others are judged. Compared to previous attempts to revamp the government's use of technology, the biggest differentiator is actually not the visible solutions that GOV.UK entail: it is the way GDS have changed the "weather" within government.

Working from July through September, the team rapidly iterated through clickable prototypes of a new Branchekode service, soliciting feedback from business owners and front-line workers along the way.

By starting with a proposal and embedding the community in an iterative design process, the team was able to present a vetted proposal at day 60, leaving 30 precious days to adjust the plan.

In both understanding user needs and developing design proposals IDEO worked iteratively. When creating visual material such as the logomark, proposals were made in rounds with feedback on each round collected from across the organisation in a single day.

The effort was twofold: create a finished suite of tools and information, and simultaneously iterate and refine a "generative framework" or DNA for the design of future consumer experiences that the Bureau will build on its own.

Whereas a linear process moves from fuzzy to concrete over time, an iterative design process regularly cycles between rough sketches and more refined presentations.

Like many startups, the team applied an agile development process paired with user-centred design, meaning that they work in a collaborative, multi-disciplinary fashion. This allows them to structure their work into a series of iterative 'sprints', each achieving incremental development goals in weeks rather than months.

Based on feedback from the public alpha as well as further iteration, the team released a beta continued to iterate in public.

Alpha is the first usable version, though it may not represent the whole of the proposed software's functionality; beta is the second major iteration which has full functionality though it may still have bugs, and both are followed by the release or final version. These phases are used for testing and iteration.

GDS use a similar approach to the design of GOV.UK by maintaining a set of design principles that have been publically available since the launch of the alpha version of the site. These have been revisited and refined over time as the team learn more about what works and what does not, but the principles and the fact that they are shared publicly, "set out some rules to guide our thinking and to keep us honest".

Prototyping implies that making one version of a thing will inform its own subsequent refinement. By introducing the notion of a "vehicle"—or trojan horse—we are extending the concept of prototyping to suggest that the making of things can also affect the formation and function of the more diffuse layers around it: the cultures, institutions, and systems that shape our world.

An iterative working style, the HDL Studio represents a model of problem solving that diverges from more common linear approaches that judge progress incrementally.

We prefer to describe them as existing in a continuous feedback loop where quick iterations of framing the problem and sketching potential solutions create a virtuous cycle of learning.

Innovation in mysterious situations requires an iterative approach, improving with each cycle of the feedback loop as ambition and opportunism are calibrated into a dynamic equilibrium. The bigger the challenges, the less likely one is to ever see perfect convergence between framing of the problem and implementation of solutions. Such challenges will always be asymptotic in nature, aiming for but never reaching perfection.

Sometimes the decisions one makes about a small-scale detail have large-scale impact, so—whilst intentions are transformed into specific plans—continually iterating through different scales helps to round out unexpected bumps.

By working through multiple phases of expansion and contraction a balance may be struck between the speed of an intuitive approach and the rigour of an analytical one, with each technique reducing the risk of the other. This cyclical approach allows the iterations to happen quickly.

The quick iterative model has recently gained traction in areas outside of design as well, perhaps most notably in the popular software development methodologies described as "agile".

Doing so in an iterative manner helps to refine the connections between insights and opportunity. This requires the ability to follow your intuition to get started, but more importantly to learn quickly from your mistakes. These iterations and your evaluation of them enable a transition from intuition to tested strategic intent.

Iterate:
Strategic designers do not treat ideas as precious. Rather, they

develop propositions through continual cycles of exploration and refinement, allowing for the testing of variants. Often times working under an artificial time constraint and holding oneself to an arbitrary number of iterations can generate a momentum that leads to new and better ideas.

Remember that subsequent iterations act as a check and balance to reduce the risk of intuitive decisions that may prove to be wrong.

Whiteboards are critical because they are naturally large-format. The larger your whiteboard surface, the better. The necessity to erase and redraw as conversation evolves is a useful quirk, as the re-inscription of ideas gives them an opportunity to develop in new ways either in substance, as they are brought back into the consciousness of the group, or in representation as they are literally re-presented through rewriting or redrawing.

Maintaining a gentle scepticism throughout this cyclical approach enables the strategic designer to unpack a given starting point into an expanded list of questions, opportunities and inspirations.

Model and Prototype:
Hand in hand with iteration is the notion of using it to test assumptions and propositions.

21

The designer must study and understand the requirements. pp.48

Analysis is the ordering and structuring of the problem. Synthesis on the other hand is characterised by an attempt to move forward and create a response to the problem- the generation of solutions. Appraisal involves the critical evaluation of suggested solutions against the objectives identified in the analysis phase. pp.37

The initial expression of design problems may often be quite misleading. If design problems are characteristically unclearly stated, then it is also true that designers seem vener to be satisfied with the problem as presented... Eberhard (1970) suggests that there are two ways in which designers can retreat back up the hierarchy of problems, by escalation and by regression.

Escalation:
Leads to an ever wider definition of the problem.

Regression:
This trail of regression is to certain extent encouraged by some of the maps of the design process...this behaviour is only one logical outcome in practice of the notion that data collection-> analysis-> synthesis... in design it is difficult to know what problems are relevant and what information will be useful until a solution is attempted. Both escalation and regression often go together. pp.56

Formulating:
Ways of understanding design problems: Get a brief and analyze the problem.

Identifying:
Reformulate and give structure to ill-structured or wicked problems, making them explicit and developing their characteristics.

Framing:
Selectively views the design situation in a particular way for a phase of activity that enables design to handle.

The "pattern of the problem" is comprised of all the interactions between one requirement and another which constrain what the

designer may do. p. 62

...design problems are built up of constraints which may be either entirely internal to the system or object being designed, or may be linked with some external factor not under the designer's control. These constraints may be imposed most obviously by the client or users but also by legislators and, even, designers. pp.99

The architects learned about the problem through attempts to create solutions rather than through deliberate and separate study of the problem itself. pp.44

Design solutions are parts of other design problems pp.121-123

The central and elaborate process of introducing characters is more than simply "naming" and we shall therefore call it "identifying". pp.269

The balance of internal and external constraints in a design problem is of considerable significance in determining the nature of that problem and the designer's response to it.

The completed model of design problems (figure 6.6) pp.99-106

The model is an aid to the understanding of the nature of design problems, and thus only indirectly to assist in establishing a design process...different design can reference to the model differ only in the degree of importance attached to various aspects of the problem.

Recognising the nature of the problem and responding with an appropriate design process seems to be one of the most important skills in the design. p.108

Sources of primary generator (*relation with crucial constraints):
1. the programme itself in terms of the radical constraints involved.
2. important external constraints to impact significantly on the designer's thought.
3. designers bring their own continuing programme or "guiding principles" to bear on the specific project. pp.194-195

The idea of PIG (problem identification game) is that the designer distils the problem down to a very short and simple statement from which crucially problematic relationships can be identified... can be used to try to develop others and thus expand the understanding of the problem.

Guiding principle:
The results of designers developing their own programme of intellectual endeavour. These can be seen as a design philosophy or a set of values about what design hold as important in their own domain. Often is driven by sets of values.

Design inevitably involves subjective value judgement
Indeed, designers are often distinctly defensive and possessive about their solutions. pp.123-125

2. Design problems require subjective interpretation
Designers perceive problem differently pp.120-121

Guiding principles: Designers use each project as a way of researching their chosen area, progressing their understanding of it and developing their guiding principles.

On the one hand the guiding principles clearly influence and set the mental context for each design process. On the other hand, each design problem enables the designer to learn more about the guiding principles and express them ever more clearly eventually resulting in books and lecture. In this sense, design is also a form of research, it offers an action-based method of advancing knowledge. pp.179

Designers seem to accumulate knowledge about solutions (Lawson 2004) which can help to form the guiding principles.

Briefing is now generally regarded as a continuous process rather than one which takes place exclusively at the start of the project. The other contributors to design problems are even less likely to be able to give a comprehensive description of their aspects of the problem. Thus somewhat curiously design problems are most usually solved without ever having been completely stated. pp.29

Professional designers are somehow able to understand something about their clients and users that those people seem not to be able to understand about themselves. pp.7-8

In fact today we consider that problem and solution emerge together but even at the end of a design process it is often the case that no one person or body is in possession of the whole problem description. pp.29

22

As Ullman et al.(1988) pointed out only some constraints are "given" in a design problem; other constraints are "introduced" by the designer from domain knowledge, and others are "derived" by the designer during the exploration of particular solution concepts. pp.100

Problem formulation: ill-defined problems, problems may loosely defined by the client but often not clear and mostly likely will re-define later on. In design, 'problems' are often defined only in relation to ideas for their 'solution'. and designers do not typically proceed by first attempting to define their problems rigorously. pp. 99-100

Difference between novice/senior designer:
Senior:
• breadth-first approach, top-down.
• scoping problems.
Novice:
• depth-first approach, bottom-up.
• stuck in defining problem.

Problem framing:
Designer are not limited to 'given' problems, but find and formulate problems within the broad context of the design brief. This is the characteristic of reflective practice identified by Schön (1983) as problem setting: 'Problem setting is the process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them... ..designers select features of the problem space to which they choose to attend(naming) and identify areas of solution space in which they choose to explore(framing) pp.102-103

Learn about the nature of the problem largely as a result of trying out solution.

The successful design behaviour is based on adequate "problem scoping", and on a focused or directed approach to gathering problem information and prioritising criteria. Setting and changing goals are inherent elements of design activity. pp.114

The formulation of appropriate and relevant problem structures from the ill-defined problem of a design brief is not easy- it requires sophisticated skills in gathering and structuring information and judging the moment to move on to solution generation... Christian and Dorst(1992) protocol studies: ...among senior students, the more successful group, "ask less information, process it instantly, and gives the impression of consciously building up an image of the problem. pp.101

This is the characteristic of reflective practice identified by Schön (1983) as problem setting: "Problem setting is the process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them... ..designers select features of the problem space to which they choose to attend(naming) and identify areas of solution space in which they choose to explore (framing)" pp.102-103

Designers appear to explore the problem from a particular perspective, in order to formulate or frame the problem in a way that stimulates and pre-structures the emergence of design concepts. Cross, Nigel. (2011), pp.76

"Framing" the problem in a distinctive and sometimes rather personal way. Cross, Nigel. (2011), pp.75

Kenneth Grange interprets: "Sometimes you almost have to fabricate the problem." or brings a fresh perception to the design problem so as to establish a new concept, and the rest is working this through; the perceptive insight gives "a direction." Cross, Nigel. (2011), pp.70

23

The design opportunities:

We drew together a wide range of insights from all the research and distilled these insights into three opportunity areas. These areas are intended to provide designers with a well informed and inspiring starting point from which to generate new ideas. They are by no means mutually exclusive, and will interweave and overlap in their focus and outcomes.

The first step in any good design process is to research the problem and understand the issues.

Insights from across all research streams structured into multiple clusters. Insight clusters prioritised

The desk research report is a sharable resource that has been used by ethnographic researchers to help them understand the issues around early years health, wellbeing and life readiness. Alongside the other research outputs, the desk research report will be used by people at a later stage to inform the development of new ideas.

A designer addresses development by looking for a problem – not a solution. There is only one problem, but there are many solutions. Because of the amount of competition and the pressure on finances and resources, we don't have time for mistakes. It is both efficient and risk reducing to identify the problem before developing the solutions." – David Fella, CEO main markets, Designit

Designing for the fundamental need. Designers reframe the question in terms of the real world conditions services and policy seek to affect. They look at the needs of the people in question and tailor solutions accordingly

A service designer will typically begin by trying to understand the needs of service users

This basically describes a process of beginning with many ideas – "divergent thinking" – and then sifting down to the best – "convergent thinking". The reason there are two diamonds is that the process happens twice. In the first diamond you examine numerous ways of looking at a problem and then resolve them into a brief. In the second, numerous solutions to the brief are presented, only to be sifted out in the final phase to arrive at the final design.

The Design Council began with in-depth desk research on violence and aggression in A&E. This spanned three months and cost £9,000 (€10,600).

Following the Double Diamond approach, they familiarised themselves with environments and processes. They refined the six national design challenge briefs into four overarching themes.

24

To get insight into how the idea could be realised, MindLab carried out a series of preliminary surveys of different user groups.

The notion of suspending judgement, or gaining a new perspective on problems, is one of the key contributions of design.

25

The HHC spent three months defining the problem before attempting to sketch a solution. During this period the relationship with DePuy was not always easy. As the client, DePuy was expecting results in a linear manner. In contrast, the design process employed by HHC took advantage of the early explorations to build a platform for accelerated design development, during which time the results delivered would exceed the client's expectations.

Traditional research into the subject was paired with design ethnography techniques to provide a productively enriched definition of the problem space.

Elemental was obligated to interrogate every aspect of the challenge at hand. Rethinking the issue from first principles, they tested solutions available in the market against the observed challenges faced by poor families.

The Tax Authority: DBA staff with knowledge about easing administrative burdens, Statistics Denmark, and front-line personnel would also be involved in the project. In this way many different aspects of the problem were covered and a number of competencies.

Like a good detective, the strategic designer assumes that they don't know the full story and that some things, or probably many things, are missing from the picture. In this sense there is a conscious desire to expand possibilities and question normative patterns of reasoning and perception. Seeking a diversity of new and different inputs helps complement whatever knowledge exists in a given area and contributes to the formation of a better big picture. Ultimately the designer seeks to understand the patterns governing the challenge at hand.

First principles one is able to reformulate the needs and see status quo solutions in a fresh light, exposing new opportunities

The briefing also plays a role as a common touchstone or integrator. A good briefing document frames an opportunity, describes the current reality and identifies a number of dimensions relevant to the challenge.

The brief should cover three areas: an opportunity space that issues the challenge, background to put it into context, and key dimensions that dive into a handful of relevant facets of the challenge.

26

Parallel lines of thoughts:

These parallel investigations represent examinations into different aspect of the design. What Jiricna and Venturi are both emphasising here is that, design proceeds by investigating both detail and larger-scale issues in parallel. pp.212-213

Design solutions are often holistic responses Design solution rarely map exactly on the the identified parts of the problem, rather one idea in the solution is more often an integrated and holistic response to a number of problems. pp.121-123

Design solutions are often integrated responses to design problems pp.271

It is the designer's task to integrate and co-ordinate all these constraints by whatever device. pp. 106-107

Client/designer tension then is inevitable and an integral part of the problem.

The multi-dimensional design problem... also highly interactive: physics; psycho-physics; psychology In design it is necessary to devise an integrated solution to a whole cluster of requirements. pp.59-60

....good design is usually an integrated response to a whole series of issue. If there was one single characteristic which could be used to identify good designers is the ability to integrate and combine. A piece of good design is rather like a hologram; the whole picture is in each fragment. It is often not possible to say which bit of the problem is solved by which bit of the solution. They simply do not map on to each other that way. p62

Suspending judgement: to allow creative thought to flow and ideas to mature before they are subjected to criticism. And to know when and how to evaluate as an individual, in groups, design teams.

The idea was that a designer could then propose solutions to each of these sub-problem clusters and then assemble all these sub-solutions into an overall solution. pp.11

First, although design is integrative, it is often not possible to think about the totality of the problem or indeed the solution at all times. It simply is too complex and confusing a matter. Instead designers seem to narrow their attention by setting up a situation, focusing or "framing". (2004) pp.91

Thus the idea that briefing is an early stage in the design process that consists of a one-way flow of information from client to designer, although persistent, is extremely misleading. In fact briefing is an integral part of designing and is more sensibly seen as continuous and highly interactive way of eliciting knowledge. (2004) pp.29

27

We have seen that good designers have a way of thinking that involves operating seamlessly across different levels of detail, from high-level systemic goals to low-level physical principles, Rather than solving merely "the problem as given" they apply their intelligence to the wider context and suggest imaginative, opposite solutions that resolve conflicts and uncertainties. They have cognitive skills of problem framing, of gathering and structuring problem data and creating coherent patterns from the data that indicate ways of resolving the issues and suggest possible solution concepts. (2011). pp.136

For this city car the innovative manufacturing concept is as important as the innovative design concept. This integrated thinking is essential to his approach to designing a low-cost solution

In the city car design we can see that the same kind of design thinking is applied by Gordon Murray as in his racing car design. There is a fine attention to detail, that interlocks with the overall concept and can trigger some of the big ideas as well as the little ones. And there is a breadth of approach towards an overall goal that is greater than the apparent focus of attention the car itself. (2011). pp.45-47

"The problem for the designers," Lawson commented, "is when the attempt should be made to be reconcile all the ideas, or lines of thought, which are developing. If this is attempted too early, ideas which are still poorly understood may get lost, while if this is left too late they may become fossilised and too rigid. There is no formula or easy answer to this conundrum, the resolution of which probably depends almost entirely on the skill and sensitivity of the designer. However, what seems clear is that a degree of bravery is required to allow these lines of thought to remain parallel rather longer..."

28

The character of Southwark and Lambeth It was important for this work to understand the different levels of perspective – political, national, local, and family to family – while also remaining focused on the reality of living and working in Southwark and Lambeth. By understanding the unique qualities inherent in both Boroughs we were able to build a set of design principles that would guide the design of effective and relevant innovations.

Multidisciplinary teams Design-led innovation is never about designers supplanting other areas of expertise. Designers facilitate collaboration between stakeholders, synthesising their ideas in sketches and prototypes. Design teams can include end users, people from different departments and experts from disciplines such as ethnographic research and behavioural economics.

Designing for extremes: Design thinking envisages and takes account of extremes, helping to ensure solutions cover a wide range of users and scenarios. Designing for extremes often also makes solutions more innovative and inclusive.

Design plays a crucial role in linking the clinician's surgical knowledge to the capability of advanced manufacturing technologies.

Design here is a means of understanding the needs of a variety of stakeholders (clinicians, researchers, patients and model makers) and connecting them with cutting-edge technology for solutions that are user-centred and viable.

Relevant support existed for participants, but they all had a problem accessing and combining the right services for them. They needed personal support (e.g. from voluntary sector organisations such as addiction support groups) but also access to opportunities controlled by government agencies (training such as could be got through the job centre). A more coordinated approach was needed in which all the potentially relevant organisations worked together in coalition.

Sitting within gov.uk, a new site area called Inside Government will replace over 350 government departments and agency websites.

Overall, gov.uk provides an object lesson in how in-depth design engagement with diverse user requirements, complex data sets and state-of-the-art interaction can create a simple, streamlined

service machine that brilliantly answers the needs of both users and government.

On the one hand they could help cut across disciplinary and departmental silos.

“Our society in general, and our public sector in particular face grand challenges. The need for innovation has never been more critical. Designers’ capability to holistically understand problems, user needs and global trends, need to become a fully integrated method of public sector innovation.” – Lars Mikkjelgaard-Jensen, Managing Director, IBM Denmark and Chairman of the Danish Design Centre

Silo structures are a perennial problem in government. While the structural factors that cause this may be stubborn, design methods offer uniquely effective ways of understanding which teams, departments, experts and specialists are relevant to a problem and engaging them in collaboration.

Design is a process that makes connections. The design process has the proven ability to forge connections between people and organisations, unlock solutions and address change.

From the user to the system Design-led innovation can be seen as comprising three types of activity:

- user-engagement
- multidisciplinary teams
- work with systems

A simple “persona” diagram for the unemployed person we referred to earlier can help explain how this works.

Rather than disjointedly patching together incremental solutions to problems as they arise, design thinking looks at the entire system to redefine the problem from the ground up.

By mapping a user’s journey around a system’s touchpoints, designers are able to see quickly which departments and areas of expertise are relevant, how they might be better joined up and who the relevant personnel are. These individuals can then be included in the design process.

Work with systems:

We are always already caught up in systems of various sorts, but many of them have grown up haphazardly. They have been designed, but not consciously. By using design process to see the way a system works, we can cut out waste and better join things up.

Design disciplines such as user journeys quickly identify where different departments need to work together and visual communication facilitates this. To this we can add that design’s capability for multidisciplinary team work is highly relevant to policymaking, where such a multitude of different disciplines often informs the process

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According to Buchanan, design affects contemporary life in at least four areas: Symbolic and visual communication, the design of material objects (construction), design of activities and organized services (strategic planning), and finally the design of complex systems or environments for living, working, playing and learning (systemic integration).

MindLab used a wide range of approaches in its work to carry out a change in attitude. MindLab interviewed people who had suffered industrial injuries and devised service-journeys, which mapped the different actors involved in a work injury case – seen from the citizen’s perspective.

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After introductory meetings with policymakers, we mapped the stakeholder ecosystem, noted areas to explore, and synthesized agency goals.

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Service design is the activity of collaboratively planning and organizing the people, back-end systems, communications, and material components involved in delivering a service, in order to improve the quality of interactions between service providers and service users.

design process created a space of opportunity where this diverse set of expertise could be integrated and applied. In addition, the Elemental team maintained a professional distance from the challenge to strengthen the rigor of their observations and design decisions.

He was positioned to link the Bureau’s beginnings to its ongoing efforts so as to present a coherent brand. Eventually Jackson was selected for the role of Assistant Director for Consumer Engagement, which helped ensure ongoing alignment among consumer-facing initiatives by consolidating purchasing authority and a mandate to work horizontally across all of the Bureau’s silos.

(Geoff Mulgan, Nesta, design methods design thinking) They spark creativity and help us to spot the possible connections between things, which so often become obscured by the silos of daily life which dominate governments and businesses alike.

Whereas an engineering approach uses successively smaller scales to hammer out the details, designers switch between scales during the course of their work because looking at each scale brings up new questions. Sometimes the decisions one makes about a small-scale detail have large-scale impact

Translating between different perspectives and assumptions enables the strategic designer to act as the intermediary between disparate ideas, viewpoints and even goals. Being able to translate in this manner is an essential precondition for being able to integrate many things.

Skillful integration is what illuminates the complex web of relationships—between people, organizations and things — that is necessary to synthesize a point of view and ultimately deliver well-calibrated solutions.

Based on this framework, the Studio proposed a set of ten ‘hunches’ that constitute areas of opportunity which together offer a strategic impact. Importantly, these ideas span from birth to death and are not bracketed by typical ‘elder’ timelines.

The opportunities are the critical hinge between the way things are now and how things could be. Together these two outcomes form a bridge between current realities and a projective future, reinforcing the importance of stewardship and integration within strategic design.

A strategic framework is the result of breaking down the initial challenge, putting everything on the table, and then re-assembling it in a synthetic manner.

Overcoming the roadblocks along the way was enabled by abilities in integration, visualisation and stewardship which form the core of the strategic design skill set.

Information that is critical to frontline stakeholders might be in-

visible to national decision-makers, for instance, so using scalar thinking is a way to be sceptical of a situation, see it through the eyes of others, and target your inquiry to uncover the relationships between big and small. The goal in pursuing these various lines of questioning is to cast the net as wide as possible and gather the broadest set of inputs to create a diverse ‘gene pool’ for subsequent synthesis.

Sitra, developing a strategy for Finland to reach carbon neutrality is not possible if we think about the issue on one scale alone. To truly make progress in this area multiple levels need to be thought about in parallel and in concert. Work Between Scales Understanding insights and propositions as situated within S,M,L,XL contexts in time and space enables the strategic designer to also think about the way decisions at one particular scale have an affect on, or are affected by, decisions at other scales. Being cognisant of scale is a practical way to be sensitive to the interconnectivity of our world.

An important outcome from this process was a system map that described how the interaction between user and government was assumed to flow seamlessly via the digital interface, but in actuality included many potential diversions that caused delays and other difficulties. The findings helped the team come to terms with the scale of the problem. (GOV.UK)

While they were finding the frontline, the team articulated their insights in the form of service design artefacts such as a system map. These were used to illustrate a user’s journey as they interacted with multiple organisations attempting to fulfil their needs. They provided a strong visual way to differentiate between the official frontline and how users were expecting the system to work.

Such a map can be useful first as a diagnostic tool and later as a guide to help locate the sites of necessary redesign.

MindLab complemented the assumed system map with an experienced one, based on their ethnographic work locating the actual frontline.

...system map, which could then be used to illustrate the variety of gaps in the system and the possibility of a user’s case being negatively impacted (or dropped altogether) when the many actors within the system responded in an uncoordinated way.

A system map may be usefully correlated with the story of a user or user type (this is typically referred to as a ‘service journey’) as well as data on the various nodes in the system.

A visualisation of the network of actors who are involved in providing a service to users or otherwise address their needs.

The third set of tools which are being creatively adapted come from systems mapping and thinking, which focuses attention to connections and causes. Systems thinking prompts us to ask the right question rather than taking questions at face value.

Getting the questions sharply focused is the necessary condition for getting the answers right, and, in general, the more we can think systemically rather than in institutional and disciplinary silos the more likely it is that we will achieve results.

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There are three main ways of dealing with this (uncertain future) in the design process, which we might call procrastination non-committal design: as non-committal as possible whilst still actually proceeding (flexibility), Johansen ‘if we assume the nature of our accommodation will change in the near future, then we

must write programmes not for the present, but for the future as well.’.....he must design building which are themselves capable of changing. throw-away design. pp.114-116

Designing in times of rapid change is clearly more difficult than designing for a stable and predictable world.

Good designers tend to be at ease with the lack of resolution of their ideas for most of the design process. Things often only come together late on towards.

The end of the process. Those who prefer a more ordered and certain world may find themselves uncomfortable in creative three-dimensional design fields. Characteristically designers seem to cope with this lack of resolution in two main ways: by the generation of alternatives and by using “parallel lines of thought”. pp.154

These parallel investigations represent examinations into different aspect of the design. What Jiricna and Venturi are both emphasising her is that, design proceeds by investigating both detail and larger-scale issues in parallel. pp.212-213

The central issue here is the designer’s ability and willingness to allow two or more of these parallel investigations to take place without necessarily trying to resolve them too early. However, it is not simply a matter of detail or general. Designers can be seen to develop and sustain many incomplete and nebulous ideas about various aspects of their solutions. It’s quite clear from Venturi’s description of the whole design process that much of the refinement is carried out in parallel with that of other ideas without attempting to resolve them too soon. pp.212-213

Communicating uncertainty:

Designers it seems need to be comfortable with the idea of differing levels of uncertainty within the design. Typically designers’ drawings indicate uncertainty through style. A rough sketchy free-hand style with a soft pencil is more likely to indicate the lack of definition compared with a more precise line drawn mechanically with a pen. pp.34-50

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Designer generate early tentative solutions, but also leave many options open for as long as possible, prepared to regard solution concepts as necessary but imprecise and often inconclusive. pp.54

“I really have, perhaps, one real talent; which is that I don’t mind at all living in the area of total uncertainty”-quoted by Davies, 1985 pp.53

There is the need to tolerate and work with uncertainty, to have the confidence to conjecture and to explore, to interact constructively with sketches and models, and to rely upon one’s “intuitive” powers of reflection-in-action. Cross, Nigel. (2011), Design thinking, Berg. pp.26

The problem for the designers: Lawson commented, ‘is when the attempt should be made to be reconcile all the ideas, or lines of thought, which are developing. If this is attempted too early, ideas which are still poorly understood may get lost, while if this is left too late they may become fossilised and too rigid. There is no formula or easy answer to this conundrum, the resolution of which probably depends almost entirely on the skill and sensitivity of the designer. However, what seems clear is that a degree of bravery is required to allow these lines of thought to remain parallel rather longer....Coping with uncertainty, as Ted Happold emphasised, seems to be a key factor in design ability. Cross, Nigel. (2011), Design thinking, Berg. pp.15

To cope with the compound uncertainty of lacking a clear strategy but being 'on the hook' for very specific and concrete decisions, many designers have developed ways of working to clarify inputs and outputs, problem and solution, opportunity and ambition, in tandem.

Being comfortable with uncertainty means one has to be able to suspend disbelief and maintain a trajectory through situations involving doubt and, inevitably, risk. The combined effect of these traits is to enable balanced judgement in selecting relevant problems and pursuing viable solutions.

Leverage Intuition:

To benefit from iterative work, the cycles have to happen with a certain degree of urgency. Working in this way often means using your intuition to make decisions that are not able to be fully vetted out.

The origins of the new design features lay in Kenneth's functional, practical approach, and on his personal experience. His starting point was his own use of a sewing machine: 'I chose to use it, actually making things with a sewing machine, so I did fairly quickly come to understand just fundamental strengths and weaknesses.' ...Kenneth therefore simply moved the sewing machine mechanism rearwards on its base, creating an off-centre layout with more base-table space in front of the needle than behind it... (2011) pp.55-57

Re-design the timetable for railway 'I was asked to redesign a timetable for them, it was one of those printed sheets that you got, organized from purely the point of view of the driver which is the way railways grew up...The person rushing into the station, the only thing he knows is where he is going, you want to be able to look up your destination and then see the time of the train, but it was exactly the other way around.' so Kenneth re-designed the timetable so that 'Where you are going comes first, and after that comes the time the train leaves.'

Another radical change in this particular sewing machine design was also a result of simple, fundamental assessment of how the machine is used. Kenneth gave the base of the machine radused lower edges, which might look something like a mere 'styling' feature, but in fact also arose from function.... The sewing machine design demonstrates how Kenneth Grange approaches design from a functional viewpoint. The innovative 'style' and features of the new machine were generated from considering and responding to the normal patterns of its use....My attitude is to want it to be a pleasure to operate. Another aspect of this approach is that he considers the whole pattern of use, as exemplified by considering the requirement of periodically cleaning the machine, and by considering how the user prepares... (2011), pp.58-60

To improve pit-stop procedures, Gordon hired a film crew to film the team practising pit stops, and then played back the film, stopping it to identify difficulties and errors, and advising ways to improve the procedures... The new systems, the improvements, and the training of the pit team got the actual stopped-time down to under the target of ten seconds.(2011), Design thinking, Berg, pp.40-42

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Designers' observations are particularly effective because they go beyond the focus group or survey to observe real user behaviour, often identifying needs and behaviour people are not aware of themselves. Designers observe user behaviour in the real world to identify needs people are often not aware of themselves.

Ethnographic research is a qualitative research method that allows researchers to investigate an issue in its real context. Rooted firmly in behavioural science, ethnography allows researchers to gain insight into complex issues: moving beyond what people say they do to what they really do. The ethnographic research built on the key areas identified through the literature review, community engagement activity and initial consultations. We began the in-depth research with a set of hypotheses. These hypotheses provided a framework for the research and allowed us to identify certain themes to challenge and test.

Many people find it hard to articulate what they want or need. Taking an ethnographic approach allowed researchers to gather evidence through both conversation and observation that uncovered hidden or latent needs and aspirations. Ethnography sits well alongside other types of research and adds rich qualitative insights that cannot be achieved through traditional desk research or second hand descriptions.

Ethnography is based on principles of non-judgment. A researcher listens and seeks to gain an understanding of a person's life without placing their own slant on what is heard. This helps to develop trust and ensure that the insights gathered are genuine.

MindLab interviewed nine young people with educational backgrounds ranging from secondary school to university and staff from the Danish Tax and Customs Administration (SKAT) department, regions and local call centres.

Hatch & Bloom's "design anthropologists" conducted ethnographic research into user behaviour, looking for needs and wishes both spoken and unspoken. By observing and interviewing users, the agency learned that food services relate to many issues beyond the actual food, gaining insights concerning packaging, colours, loneliness, meal sizes and preferred dining environment.

Over a three-month project, the design team talked to and shadowed 12 long-term unemployed people to build up a picture of their needs and experiences. They also talked to service staff, discovering the extensive but sometimes confusing array of support services available.

Lindsey Craig, Policy and Strategy Officer, says about using video: "We found it's a really good way to get staff bought in. It's much more difficult to argue against than a report. It also allows customers to tell the story in their own words. People obviously feel comfortable being filmed, and I didn't expect that."

Initial interviews and observations with front line staff and patients have revealed the need to further distribute services and resources within the community.

Participant observation:

Participant observation creates an understanding of the context in which your project work takes place. Through participant observation, it is possible to see what is actually happening and which actions take place in practice. Therefore the method is a good way to supplement interviews, as there is often a difference between what people say they do and what they actually do.

MindLab's specific contribution to the project was to develop a new solution in cooperation with ERST – a new industry code site (branchekode.dk) that would eliminate the difficulties. This was based on interviews and observations of companies, observations of telephone conversations in ERST and Statistics Denmark and interviews with employees in the Business Centres.

MindLab interviewed a number of young taxpayers and spent time with them observing when they logged onto SKAT's online system (TastSelv). The conclusion was clear: Compared to using Facebook, using TastSelv requires completely different competencies. It requires young taxpayers to have knowledge of the tax system and an overview of which entry fields on their preliminary tax statements are relevant.

The ethnographic interview provides an in-depth and specific insight into user experiences in relation to the current situation. The interview can also help to refine the existing knowledge and provide new perspectives for the further analysis and concept development in the project

Some of the first interviews with citizens, which were video-filmed in their own homes, were, according to Lind, of great significance. To staff, it was almost shocking to learn that although their case management was perhaps legally correct, citizens experienced it as confusing, bureaucratic, and sometimes nearly meaningless (case).

...use a range of ethnographic techniques to study how business owners experienced the online registration, and how various public agencies internally dealt and collaborated around the branch codes. Building on insights about user experience outside and inside the system, designers then carried out iterative.

The latter often draw on other disciplines such as ethnography and cultural research in order to ground the design work in how people experience and engage with existing or future communication, products, services and systems.

The use video for design research: The case workers then filmed their own interactions with clients seeking public housing, leveraging this material to generate new ideas of how to improve the service. In Odense, the adult mentally handicapped users were given digital cameras to document their aspirations for their workplace; subsequently they co-designed new offerings and services together with the managers and social workers. In Adelaide, designers, sociologists and a public manager practically lived with vulnerable families for months to conduct in-depth ethnographic research.

MindLab's research among potential users showed that for such a model to be successful, it is necessary to invest in the mentors' and mentees' abilities to help each other.

Providing research tools such as ethnography and visual mapping to help decision-makers see problems differently.

To structure our fieldwork, we identified a wide range of stakeholders in the admissions process and narrowed in on those most intimately involved.

Our conversations centered on the needs, hopes, and reactions that people had throughout their experience with high school admissions. With families, we observed whether they entered the process early in 6th grade or came late to the process in 8th grade. To meet our goal of representing diverse voices, we met with students who had special needs...

To better understand how students felt about the admissions process, we used associative card games when meeting with 8th graders in Brooklyn and the Bronx.

We used the needs identified during our fieldwork to create a series of prompts for design action, featured on the following pages. These prompts spring from the stories people told us. But they're distilled and refined, with an eye to feasibility and relevance.

Interview sessions and co-design workshops were organized to identify information gaps, areas of confusion, and "pain points" in the current process, and to gather insights to inform and inspire design solutions.

Students analyzed existing conditions in the South Bronx neighborhood of Melrose, an area with significant HPD investment. A series of videos produced by the students highlighted community assets in Melrose, including social entrepreneurship, cultural diversity, and channels for community-based learning.

Site visits to the HPD field office in Brooklyn and to HPD developments in the Bronx, observations and interviews with developer and HPD staff at a lease-up interview site, also in the Bronx.

...on-the-street interviews, in Manhattan and the South Bronx, with several dozen past and potential affordable housing applicants...

According to design research with staff from housing developers, marketing agents often spend a significant amount of time processing and interviewing applicants with a low success rate.

During design interviews on the street in the South Bronx, several respondents said that they "just took a stab at the lottery," unaware of how strictly income requirements are adhered to, assuming that it couldn't hurt to try, and thinking there was a good chance that they would get an apartment.

Based on the findings described above, the following questions emerged as drivers for design efforts.

The project team will use surveys, interviews, and observations to conduct the evaluation before, during, and after pilot implementation.

Interview and workshop participants were asked to propose solutions that emerged from their own lived experience and expertise. The project team was able to observe and respond to information gaps, areas of confusion, and “pain points” in the current process.

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Improvements to the quality of the site can be judged by assessing the usability of the new site in comparison to one of the many it replaced. In one test GOV. UK was 40 per cent faster based on observed user testing.

Crucial to the success of the new site has been a determined focus on user needs. As GDS CTO Liam Maxwell puts it, “people don’t really care about which department delivers a service; they want the service from government.

Close observation in the field led the team to realise that while the service in question was digital, its “frontline” spanned both online and offline.

Some users who became frustrated with the website resorted to calling a telephone hotline or going so far as to visit an office in person.

Observing the dynamics of the frontline office had sharpened their understanding of the relationship between business owners and frontline workers, and also the missing relationship between different authorities. This was the genesis for a possible solution.

If one is hyper-observant of the environments and behaviours they spend time with during this process, it can also be a useful way to discover potential solutions that already exist at a small scale.

Through in-home interviews with housewives who were identified as the typical household champions of composting, The Daily Dump was able to identify “make or break” issues for the product’s success such as concerns about cleanliness and ease of use. These interviews led to the development of accessories such as an apron and educational material that clearly explained the process.

The Daily Dump is approaching this work the same way that they did composting: a process of stakeholder interviews in the field, analysis of existing conditions, careful observation, and speculation about what points of leverage will yield the best results first.

At the core of their research methodology is Kasturi’s commitment to design ethnography which she has been honing since her first waste-related design project as a student in the 1980s at the National Institute of Design. By interviewing stakeholders at every organizational level of the problem, observing users at each touch point within the system, analyzing analogous projects, and learning by doing, the Daily Dump is able to map out new problem spaces and position themselves to better assess the “shade” that new product ideas can generate.

Through video and in-person observation, the HHC team discovered that the formality of the operating room varies by culture.

Video ethnography figured heavily in the HHC’s observation of surgeons, surgical staff and the operating environment. Over a dozen operations were captured with both wide angle and close up footage yielding nearly 50 hours of video. Using a spreadsheet to catalogue surgical steps and time increments for each step, the design team and ethnographer were able to identify 147 coping mechanisms and as many as 110 problems that were not being addressed by the surgical team.

Observation, enabled by the lens of design ethnography, provided the design team unfettered access to the austere and often highly personal surgical space. Video ethnography in particular proved that standards of care content with the inefficiencies and resulting coping mechanisms developed by conscientious practitioners. Even in some situations where very high levels of care were being given, these outcomes were despite evident blind spots within the ecosystem of the operating theatre, the hospital, and even the health care system at large. By acting as unbiased outside observers, the HHC’s design team could ask basic questions about seemingly unimportant things to assist in illuminating these blind spots and turning them into opportunities for redesign.

Over a period of a couple weeks exploring potential solutions through sketches and physical models, the HHC team synthesized the insights from their design ethnography and research process into a proposed solution.

Traditional research into the subject was paired with design ethnography techniques to provide a productively enriched definition of the problem space. Video observation, role playing, and conversations about analogous items were used by HHC to slow down the fast paced, intense decision making environment of the operating theatre and insert the possibility to carefully question the status quo, catalyzing new opportunities for redesign of previously invisible failure points

Because the design process involves up-front investment into clarifying the problem through ethnography and research, progress can seem “invisible” at first. This may make some clients uncomfortable if they are expecting a linear incremental process. However, this early investment pays dividends later in the process when solutions can be more readily tested against robust knowledge of the problem space.

Focused ethnography was mirrored by a similar effort within the system to foster empathy towards users and administrators alike.

Fieldwork and user involvement of business owners and government staff were again important sources of inspiration for the design proposal.

DBA sought out the frontline staff and spent time with them. Through observations and interviews with staffs and management, the team were able to understand Branchekode more empathically. These engagements enabled the project team to perceive the ‘seams’ of the system: the places where intervention or reinvention of services was possible.

MindLab used audio recordings to document their interviews which were then edited from more than an hour down to narratives of less than three minutes, each illustrating different insights.

MindLab complemented the assumed system map with an experienced one, based on their ethnographic work locating the actual frontline.

The project began with needs finding, including a series of interviews with business people who had experienced extreme interactions with the system. Government staff people accompanied MindLab on these visits in a conscious effort to spread professional empathy throughout the coalition of organizations involved. They also participated in workshops afterwards to synthesise the insights. Audio recordings were made of the interviews, allowing the material to be edited for use in later situations, where the need for change could be powerfully conveyed to individuals who were not able to be part of the ethnographic fieldwork first hand.

Work began with research into the experiences and perspectives of citizens, including roughly twenty ethnographic visits

with users who represented edge cases.

Accurate and actionable shorthand when talking about target users. This behaviour segmentation was achieved by mapping consumer behaviour discovered during ethnographic research.

Quotations from ethnographic interviews that embodied key insights from the user’s perspective.

A first set help with understanding. Designers have adapted some of the methods of ethnography to see how the world looks and feels to the users of services, tools that were at times used in public services but more often forgotten. Sometimes the decisions one makes about a small-scale detail have large-scale impact. For example, John Snow’s discovery of the water-borne nature of Cholera, and his ability to curb its spread in central London, came down to a single water pump. See ‘The Visual Display of Quantitative Information’ by Edward Tufte and ‘The Ghost Map’ by Steven Johnson.

Through conversations with students, teachers, administrators and other stakeholders, the Studio discovered a number of embedded assumptions about the system itself and about the ‘lost boys,’ a revealing term used to describe dropouts.

All of this requires observation and a fundamental understanding of people, things and decisions as situated in time and space and therefore connected to and influenced by their context, environment and mental state of being. The difference between being aware of these issues and understanding them well enough to respond amounts to a difference in attitude.

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Design as a contribution to knowledge:
...design consists of three elementary activities which Zeisel (1984) called imaging, presenting (drawing, the center role of design process) and testing (look back CH5). Imaging is a rather nice word to describe what the great psychologist Jerome Bruner called “going beyond the information given” ...design can be seen as a kind of investigative process and, therefore, as a form of research... design works with two types of information which he calls a heuristic catalyst for imaging and a body of knowledge for testing.

Problem-solving obviously requires more attention to the demands of the external world than to inner mental needs. In imaginative thinking, on the other hand, the individual is primarily concerned with satisfying inner needs through cognitive activity which may be quite unrelated to the real world... The control and combination of ratiocination and imaginative thought is one of the designer’s most important skill.

Designers as a threat to their creative role:
Throughout much of the literature on productive thought we find a variety of closely related binary divisions between, on the one hand, rational and logical processes and, on the other hand, intuitive and imaginative processes. These two major categories have become known as convergent and divergent production (Fig. 8.1). p.142 (Divergent thinking)

There is the sort of thinking we do when we say are trying to think where we left something. This is essentially remembering and is obviously vital to design but again not the central task. There is the use of the word ‘think’ which we apply to the act of concentrating or simply paying attention, as when we say ‘think what you are doing’.

There is the use of the word to mean belief as when someone says what they ‘think’. There is the thinking which psychologists would label ‘autistic’ but which ordinary people might describe

as daydreaming. This leads to a sort of uncontrolled stream of consciousness which in itself can be useful to designers but is certainly not their main tool. There is the sort of imaginative thinking we do which might be described as fantasy anchored in reality. Here we might ‘think’ through some scenario which is possible but not actual. Clearly this is very much what designers do. p.130

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Exploratory:
Designer interprets the design brief not as a specification for a solution, but as partial map of unknown territory, to discover something new.

...Invent thing of value do not yet exist...

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How they analyse and why they trade one idea off against another. The ability to look beyond received opinions and to articulate latent needs and emotions is of particular importance in the health field where, as we have seen, an understanding of attitudes and motivations will determine the success of co-created services. Understanding these issues will ensure that the services delivered fit seamlessly with real people’s lifestyles and desires and are accessible to all.

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In moments when deliberation among existing options proves unsatisfactory, strategic design employs synthesis to create new possibilities where none seemed to exist before. Under this methodology, analysis is not the platform on which decisions are made, but becomes a step used to inform the design of revised or totally new alternatives. As a capability that enhances innovation, strategic design is therefore most useful in contexts where the stated vision may be compelling but there is no clear pathway to progress.

For Sitra, strategic design enables us to explore this delicate combination of pragmatism with imagination: research through prototyping, learning from execution, communication through tangible projects, strategic intent with iterative action, systems thinking and human-centredness, all underscored by an optimistic belief in progressive change.

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Representing:
• Ways of representing design situation: In practice, design always externalise their thoughts prolifically.
• Conversations with representations: Designers interact with these representations in a conversational way (Schön 1983). The forms of representation not only can be design drawing, diagram and visionary drawings but also words, texts (Though textual information is seldom recorded during design process)
• Working with multiple representations: Drawings, computer models, textual descriptions, physical models and so on which process enables the reduction of risk to the designer.

Types of drawing:
Referential drawings, diagrams, design drawings, presentation drawings, visionary drawings.
• Presentation drawings: convey information about the current state of proposed design. This may be at what is expected to be the completion of the process or at some intermediate stage.
• Instruction drawings
• Consultation drawings: as a special category of presentation drawings that intended to convey information from designers to

client or user or other participant in the design process.

- **Experiential drawings:** the process of drawing is one of the best ways we know to absorb design ideas. The need to pass an idea from eye to mind and then to hand results in a level of understanding.

- **Diagrams:** bubble diagram, the drawing in this form is intended to show the important connections required between elements and is thus a graphical representation of what might be in a brief.

- **Fabulous drawings:** not used to test an idea but rather to let it flourish and develop so they are usually “uncritical”...They often represent something that in fact could not exist (fabulous part)

- **Proposition drawings:** (Designer’s way of making, recording and testing hypothesis. The propositional sketch becomes a sort of graphical “what if” tool Lawson, Bryan. (2004), What designers know, Architectural Press publication. pp.53)

- **Calculation drawings**

Communicating uncertainty:

Designers it seems need to be comfortable with the idea of differing levels of uncertainty within the design. Typically designers’ drawings indicate uncertainty through style. A rough sketchy free-hand style with a soft pencil is more likely to indicate the lack of definition compared with a more precise line drawn mechanically with a pen.

Drawing as symbol systems:

Goel (1995) notes that both the brief and the final production drawings are representations...that designers can somehow transform one set of knowledge about people, behaviour and goals into another set of knowledge about artefacts, connections, structure and physical properties.

Design as conversation and perception:

Donald Schön first suggested this idea when he talked of how a designer “has a conversation with drawing” (Schön 1983). In this view of design the designer performs the act of drawing not to communicate with others but to pursue a line of thought. As the image of the drawing develops it enables the designer to ‘see’ new possibilities or problems. More recently we have seen designers using computers and as a result having ‘conversational’ interactions with their computers about their designs.

Goldschmidt (1991) points out how sketches enable a dialogue between “seeing that” (process of reflective criticism) and “seeing as (process of making analogies and reinterpretations)”. In fact it is one of the most flexible and powerful tools for conducting the conversation of negotiation between what is desired and what can be realised.

What is important for our consideration here however is not the whole model but those kinds of drawing with which, as Schön put it, designers have conversations. technically this is possible with any kind of drawing. Indeed it is possible too with text. When I write this book I don not know in advance every detail of what I am going to say. I have a rough idea, some major themes and an overall structure. As the text begins to emerge on the word processor I may from time to time, and indeed I do, change my mind. In a sense then my own words speak back to me, as if I were talking to myself, and when I hear them I may feel the need to make adjustments. This is what Schön describe as ‘reflection in action.

When designers are producing drawings entirely for their own benefit as opposed to presenting information to others, the reflective process is almost the whole point of the drawing. It is these design drawings, sketches, scribbles, diagrams and the like that most offer this conversational potential. This was perhaps most eloquently described to me by the great architect/engineer Santiago Calatrava (Lawson 1994).

“To start with you see the thing in your mind and it doesn’t exist on paper and then you start making simple sketches and organising things and then you start doing layer after layer.. it is very much a dialogue.”

Suwa and Twersky have studied the way designers work with drawings in a more controlled setting. Their work clearly suggests that designers respond to the geometric properties of drawings as they develop them and from this may ‘see’ other ideas than those that were in their mind before they began the drawing (Suwan and Twersky 1997)... In particular what this research suggests is that these design drawings tend to be of solution features rather than problem states.... The work shows that a high level of activity involving such considerations often follows the act of drawing. The drawings then are primarily images of the materiality of what might be , while designer may also be considering the more abstract sets of needs and wishes.

One can see in this sequence of drawings how scarpa first draws the lines, then sees the problem and finally solves it. Thus the drawing appears to talk back to the designer enabling a problem to be discovered and a solution created. However there remains the danger which we saw in CH13 of falling into the icon trap. That is too say the drawing begins to dominate the conversation, sets the agenda and ultimately becomes the designed object replacing the original object.

On the other hand research evidence suggests that designers, just like artists, do get inspiration and ideas from their drawings that they did not imagine in advance.

They have a great deal of knowledge about existing solutions and their potential affordances. The ability to execute referential drawings outside the actual process of design seems likely to be central to the development of this episodic knowledge of precedent. In short, designers tend to keep sketchbooks. The skills of observation and recording are thus central to the ability to store knowledge that may later be used in formulation. Clearly a designer’s guiding principles will tend in turn to influence the kinds of experiences and references sought out, gathered, reflected upon and stored.

Communicating uncertainty:

Designers it seems need to be comfortable with the idea of differing levels of uncertainty within the design. Typically designers’ drawings indicate uncertainty through style. A rough sketchy free-hand style with a soft pencil is more likely to indicate the lack of definition compared with a more precise line drawn mechanically with a pen.

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Acknowledging the dialogue or ‘conversation’ that goes on between internal and external representations is part of the recognition that design is reflective. The designer has to have some medium- which is the sketch- which enables half-formed ideas to be expressed and to be reflected upon: to be considered, revised, developed, rejected and returned to.

The thinking processes of the designer seem to hinge between internal mental process- external expression and representation in sketches (Dialogue between mental process and external expression by sketch as medium).

As the engineer-architect Santiago Calatrava has said: ‘To start with you see the thing in your mind and it doesn’t exist on paper and then you start making simple sketches and organising things and then you start doing layer after layer... t is very much a dialogue.

Sketching:

It is not just formal or shape aspects of the design concept that are compiled by sketching; they also help the designer to identify and consider functional and other aspects of the design... Suwa, Purcell and Gero (1998) suggested that sketching serves at least three purposes: as an external memory device in which to leave ideas as visual tokens, as a source of visuo-spatial cues for the association of functional issues, and as a physical setting in which design thoughts are constructed in a type of situated action. (1. external memory device 2. functional issues 3. physical setting)

Purpose of communicating to someone else how a new product should be built, and also how it should work... also show how a drawing can be not only a communication aid, but also a thinking and reasoning aid.

A quotation from Santiago Calatrava to the effect that sketching is fundamental, as a kind of ‘dialogue’ situation for the designer... A design process is necessary in which the final drawings are gradually, and sometimes rather arduously approached through a series of other drawings that we call sketches. As the industrial designer Jack Howe said, about how to start a design project, or how to proceed when stuck, ‘I draw something- even if it’s potty- the act of drawing seems to clarify my thoughts’(quoted by Davies, 1985)

Apparently Alvar Aalto would sometimes use random drawing marks as stimuli to the development of ideas for building form. But in this set of design sketches we see how sketching can help the designer to consider many aspects at once.

The concepts that are drafted in design sketches are there to be criticised, not admired; and they are part of the activity of discovery , of exploration , that is the activity of designing.

Sketches enable designers to handle different levels of abstraction simultaneously....So they (designers) use the sketch to identify and then to reflect upon critical details- details that they realise will hinder, or somehow significantly influence the final implementation of the detailed design.

The identification of critical details is part of a more general facility that sketches provide, which is that they enable identification and recall of relevant knowledge..... So these large amounts of information and knowledge need to be brought into play in a selective way, being selected only when they become relevant, as the designer considers the implications of the solution concepts as it develops.

Sketches assist problem structuring through solution attempts. We have seen that sketches incorporate not only drawings of tentative solution concepts but also numbers, symbols and texts, as the designer relates what he know of the design problem to what is emerging as a solution..

As several design researchers have pointed out, sketches in design promote the recognition of emergent features and properties of the solution concept. They help the designer to make what Goel (1995) called ‘lateral transformations’ in the solution space: the creative shift to new alternatives.

...and Schön and Wiggins (1992) called the ‘reflective conversation with the situation’ that is characteristic of design thinking. Goldschmidt (1991) called it the ‘dialectics of sketching’: a dialogue between ‘seeing that’ and ‘seeing as’, where ‘seeing that’ is reflective criticism and ‘seeing as’ is the analogical reasoning and reinterpretation of the sketch that provokes creativity... Goel (1995) referred especially to the ambiguity inherent in sketches, and identified this as positive feature of the sketch as a design tool.

...without drawing, it can be difficult for designers to explore and resolve their thoughts.

Design offers opportunities for development of a wide range of abilities in non-verbal thought and communication.

Sketching provides a temporary, external store for tentative ideas and supports the “dialogue” that designer has between problem and solution.

The range of design techniques such as sketching, prototyping, mock-ups, scenarios, etc., enable the designer to make “an inquiry into the future situation of use.” These techniques “make the world a part of cognition”, and provide the designer with a set of “situating strategies.”

The early design concept has to be developed and explored through the “dialogue” of sketching, through a related visual and cognitive process, like MacCormac’s, of criticism and discovery.

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Sketch Solution:

Based on insights from user research, the designer can begin to sketch solutions. For a service, the designer will draw a map of the different parts of the service with which the user interacts – its “touchpoints”...

The lab developed the Helsinki Design Lab Studio Model – a structured engagement between experts and designers aiming to rapidly generate a “sketch” for a systemic redesign.

Designers’ visualisations help these teams understand problems collaboratively and synthesise their insights into viable solutions. They get often disconnected individuals and teams working together.

Dynamic tangibility:

Design process makes problems tangible and data visual with sketches and diagrams that quickly and clearly convey the relationships between interrelated elements and can easily be altered.

Visualisation techniques:

Visuals are a great way to get to grips with the nature of a problem and to develop solutions. Also, to develop complicated systems, you need to work with groups. Visuals help groups develop a common understanding. For instance, using post-it notes to lay out the touchpoints of a service allows participants to move them around.

User journeys:

A detailed map of user behaviour over time can be used to quickly identify the “pain points” in a service or product. These can inspire everything from small tweaks to far-reaching innovation projects. Service Designers also use these to sketch new services. These maps are called Service Blueprints. These are effectively service designers’ versions of product design sketches. Instead of sketching an object, they map the touchpoints that make up a service. They also draw storyboards to show the movement of users between touchpoints.

They asked the young people about their understanding of tax, who they thought would assist them and how, and about their experience of contact with the tax authorities, e.g. their response to electronic letters and their use of the site. In addition, they did a series of service journey sketches.

Creating a map of service users’ progress from unemployment to work showed that, while their journeys were similar, their needs were diverse.

Visual thinking and communication:

Thinking around policies tends to be done in words and numbers, making it difficult to communicate them to stakeholders and also rendering internal communications around them cumbersome. Design mitigates this by showing how ideas work simply and quickly, facilitating quick buy-in from and easier collaboration among diverse stakeholders.

Design disciplines such as user journeys quickly identify where different departments need to work together and visual communication facilitates this. To this we can add that design's capability for multidisciplinary team work is highly relevant to policymaking, where such a multitude of different disciplines often informs the process.

Tools to visualise complex structures and systems from different perspectives enable the designer to present issues from different viewpoints. They facilitate dialogue between participants who do not share a common language. Visual techniques also encourage participants to plan and to act. New ideas and solutions can be made tangible thus facilitating further dialogue, fostering innovation and reducing risk. Experience shows that participants feel 'signed up' to the solutions that are co-created, ensuring that innovation is brought to life.

Design techniques play a critical role in identifying users' needs and designing the right services around them. BUPA uses design techniques to visually map the end-to-end patient journey, based on the experiences of a small group of patients. These insights have enabled several service improvements.

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Visualization of abstract content. As a unique input to the council meeting 27 students from the Danish Design School, KADK, worked with illustrations of the large amounts of quantitative data regarding the internal market. Three of the projects were chosen to be exhibited at Bella Center giving the ministers a different and inspiring display of figures they would usually only receive in the form of charts or numbers in a report.

According to Buchanan, design affects contemporary life in at least four areas: Symbolic and visual communication, the design of material objects (construction), design of activities and organized services (strategic planning), and finally the design of complex systems or environments for living, working, playing and learning (systemic integration).

When graphical identity, physical artefacts and contexts are coupled with new service interactions and systems, design becomes a powerful, holistic discipline that can generate tangible change.

Providing research tools such as ethnography and visual mapping to help decision-makers see problems differently.

Facilitating the innovation process via creative, graphical tools such as concepts, scenarios, storyboards and prototypes.

Georgia Lupi emphasised that visualisation can serve multiple purposes and audiences. Some people just want a quick overview of an interactive graphic. Others might want to spend more time with the piece, and explore it more in depth.

In this policy studio, Brenton Caffin, Nesta (UK); Nina Terrey, Think Place (AUS); and Hilary Cottam, Participle (UK), illustrated that it is possible to change the environment with very simple design methods. This could be visual tools to help guide a conversation that takes its departure in the citizen's concerns, questions and needs, for instance. Such tools can help the citizen and the professional in reaching a common understanding of the issues, and to focus on actual problem-solving.

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We mapped the participant roles for each student we spoke with, turning up many different variations in how families, kids, and their guidance counselors engage in the process.

Conceptualizations are visualized (or even acted out), then subjected to review and testing in an effort to identify...

Visual communications assets:

Develop infographics and icon sets to help illustrate and explain HPD programs. These visual communication assets are intended to assist non-English-speaking and low-literacy populations.

The materials are designed to be helpful to potential applicants, ambassadors, HPD staff, and developers. These materials include a redesigned advertisement template to list information about a specific development, as well as a monthly-listings template that offers information about all available developments citywide. An income guide, application-process map, and a checklists document complete the suite of new HPD-branded informational materials. These materials are intended to ensure that the application process is understandable and transparent.

Process Map Document:

During participatory design-research activities, many CBOs, developers, and residents explained that they did not understand how the overall application process for affordable housing works. A highly visual process map has been developed to clearly map out the steps applicants must take to apply.

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...illustrate a user's journey as they interacted with multiple organisations attempting to fulfil their needs. They provided a strong visual way to differentiate between the official frontline and how users were expecting the system to work.

A visualisation of the network of actors who are involved in providing a service to users or otherwise address their needs.

Moving from analysis to action requires being specific about where to start, what to do, and how exactly to respond to the symptoms one is trying to address. Visualising data on a map can help answer these questions by tying statistics to real-world places. Good data maps help balance the clean nature of statistical data with the realities of our messy world.

The visualisation techniques which are second nature to designers can be particularly useful in enabling us to escape the constraints of prose and numbers which tend to dominate bureaucracies.

After working through the drawing you will have a refined understanding! Drawing is especially powerful as a way to develop a more robust consensus amongst a group of individuals who may be using the exact same words but thinking about different variations of an idea.

To see challenges in a new light we sometimes have to literally see them differently—no spreadsheet would have changed the mind of the security staff. This is why visualisation as a form of analysis rather than illustration is more effective when it is used as part of the thinking process, not applied after the fact to pretty up ideas that are fully formed. To deliver on the intention of having a circular ring of chairs required exploring the safety concerns through scale drawings that enabled our team to analyse different options and the risks inherent to each.

In advance of the studio week, the assistants prepared a mapping of key stakeholders from all sectors by placing the elderly in the center and radiating out through all strata of public and private services and relationships.

Overcoming the roadblocks along the way was enabled by abilities in integration, visualisation and stewardship which form the core of the strategic design skill set.

Whereas a typical design process might include preliminary presentations of sketchy material that is indicative of a direction but lacks detail, IDEO attempted as much as possible to show 'high-resolution' sketches representing multiple possible conceptual directions]10 during these meetings.

Sketching is how one quickly explores the relationships between details in a manner and medium that entertains multiple possibilities simultaneously. As a drawn form of analysis, it externalizes your ideas so that you can look at them anew.

A designer calls this process 'sketching.' The seductive beauty of wispy lines sketched by talented designers often gets all the attention, but at its core sketching is a way to develop relationships and details in parallel. Traditionally sketching is used to begin a design process by allowing different formal ideas to be explored in a quick and free-flowing way. The power of the sketch derives from the fact that it implicates an idea without requiring that every tiny detail be specified just yet.

The written equivalent of a sketch is the bullet-point outline, but whereas an outline only makes sense when read from top to bottom a sketch is more open to interpretation and can be read in many different ways all at once. This inherent pliability of the sketch makes it positively fungible, able to be re-appropriated when conditions or context change.

In diagrammatic form allows one to quickly explore different configurations by drawing and redrawing. Strategic design rarely lends itself to such literal translation onto the page, but we can still diagram and sketch through problems by giving ourselves the same freedom to identify key elements and then work between scales in a nonlinear way to explore their interdependencies.

By simultaneously depicting aspects at multiple scales, the act of sketching out an idea is a way to identify what matters most and what can be addressed later on.

The sketch allows for a momentary suspension of disbelief, offering the freedom to fluidly move between developing the overall idea, the essential elements and the relationships between them.

Arriving with floor plans drawn to scale illustrating the ample room there was to manoeuvre around our proposed circle of chairs, and a willingness to carefully and considerably talk through the venue's concerns, we were able to come to an agreement that would give us the all-important circle while eliminating any concerns of fire safety on behalf of the venue.

The collection of opportunities are likely to be well-informed guesses more than detailed proposals, but articulating them—even as hunches—is a way to avoid the generalities and abstractions that strategic conversations often get lost in. The specificity of the hunches, supported by sketches and diagrams, act as an arbiter between the Studio and their final review guests to help avoid situations where individuals are using the same words but talking about different things.

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Telling a story:

...the idea of narrative... the architect may tell a story about the "characters" who from the users of the building and the "roles" they play and the "rituals" in which they are set. The architect John Outram has described a complete design process based on very rich and extremely elaborate stories (Lawson 1994b). His method evolved over a number of years but was always based on the telling of stories with a mythological quality.

...the telling of stories within a design practice also seems to help cement the design team together around this shared but slightly private world.

The ideas are undoubtedly processed through concepts described in words. These words have enormous significance since they represent a complex set of characteristics some of which may help the designer to see a way of proceeding. The drawings appear to reveal problems and enable the designer to see unsatisfactory situations. Together these two powerful forces combine to make the very essence of design thinking. words+drawings->design thinking.

Indeed it is possible too with text. When I write this book I don't not know in advance every detail of what I am going to say. I have a rough idea, some major themes and an overall structure. As the text begins to emerge on the word processor I may from time to time, and indeed I do, change my mind. In a sense then my own words speak back to me, as if I were talking to myself, and when I hear them I may feel the need to make adjustments. This is what Schön describe as 'reflection in action.'

The forms of representation not only can be design drawing, diagram and visionary drawings but also words, texts (Though textual information is seldom recorded during design process)

Working with multiple representations: Drawings, computer models, textual descriptions, physical models and so on which process enables the reduction of risk to the designer.

The verbal description allows people to interpret shades of meaning not allowed by the drawing.

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Sketches assist problem structuring through solution attempts. We have seen that sketches incorporate not only drawings of tentative solution concepts but also numbers, symbols and texts, as the designer relates what he know of the design problem to what is emerging as a solution..

He also talks to himself- or rather, writes notes to himself on the sketches; notes such as 'rubbish', 'too heavy', or 'move it this way 30mm'. Eventually he gets to the stage of more formal orthographic drawings, but still drawing annotated plans, elevations and sections all together.

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"I restrain his limbs to get him to have a nap, otherwise he won't sleep. I got the idea from one of my blogs." Nancy, 28, mother of one Our research showed that families are most likely to learn from practical solutions that offer results, reduce stress, create situations that benefit both them and their children, or make them feel good about themselves as parents. Families are adept at creating strategies that work for them. However, some families are better at this than others and more could be done to spread learning between parents about what works well and what does not.

From the user to the system:

Design-led innovation can be seen as comprising three types of activity:

- user-engagement
- multidisciplinary teams
- work with systems

A simple “persona” diagram for the unemployed person we referred to earlier can help explain how this works.

Personas:

Personas are a way of focusing on different types of user and considering their needs. Using the concept of “relevant extremes” ...focusing on the needs of people at the extreme of things like physical ability, you ensure you’ve covered everyone and quite often uncover opportunities that have a wider application.

As part of prototyping, specific scenarios about the future use of a design object can be imagined. This is similar to “relevant extremes”, described above. One might conceive scenarios in which things go as wrong as they possibly can vs. ideal scenarios.

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Specific real-life stories about citizens’ lives are a powerful tool for change. Successful human-centered innovation is built on the organisation’s ability to comprehend other people’s situations and needs and transform this “professional empathy” into new ideas.

SKAT obtained new insights to what was necessary in order for the youngest taxpayers to become digitally self-sufficient. The insights were created by means of concrete stories, about young peoples actual use of SKAT’s digital solutions. This made the way for a redesign of SKAT’s online services

Storyboards:

Storyboards are used for evaluation, giving you to test ideas and concepts at an early stage by visualizing them before they are carried out and implemented. This will help you determine whether the solution will work in practice, or whether it requires corrections before it can create value for the user.

Personas:

Personas act as a link between analysis and idea generation in which the complexity of data is clarified through idealized representations of some typical features of a specific segment of users. Personas are based on thorough research about the users through interviews or other sources.

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Kid Story: Noah

Noah is from a middle-income home on Staten Island and has an Individualized Educational Program (IEP). Noah’s parents are divorced, and from what he told us, the parental advice he received during the admissions process was sometimes contradictory. Noah’s dad acted as an involved project manager, but Noah believes he could have received better support from his guidance counselor, particularly around how he needed to perform academically in order to be eligible for the most selective schools. When Noah transitioned from a special education class to a general education class in 7th grade, his grades suffered; neither he nor his father were aware that his 7th grade performance could affect his high school choices.

While Noah was not eligible to apply for the school he liked most, he was ultimately happy with his other choices and is looking forward to high school.

Provisional Personas for affordable housing services:

As part of the service-design process, designers often test concepts by conceiving service scenarios with imaginary users (whose traits emerged from design research). These user profiles — usually representing various social, functional, or demographic aspects of the actual user community — are called “personas.” Personas can be detailed character sketches, or more abstract and provisional, capturing just a few key qualities of typical service users. The following visual narratives use provisional personas to identify design challenges related to the experiences and requirements of various potential users of affordable housing services.

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IDEO identified four basic behavioural types (“Believers, Followers, Gamers, and Investigators”) which then provided the CFPB with the tools they needed to focus their efforts. By nature a federal bureau must serve all Americans, but “When you’re designing for all of America... where do you start?” asks IDEO partner Fred Dust. With four behavioural types defined, the CFPB could more carefully decide which citizens to focus on first and how to make products relevant to that particular peer group.

Based on these meta-themes the Studio proposed a set of ten ‘hunches’ targeting a variety of scales in space, from local to national, and in time, from immediate results to 100-year return on investment.

There’s no way to predict the future, but by using scenarios we can make an educated guess.

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Design as a contribution to knowledge:

A more mature approach was presented by Zeisel (1984) in his discussion of the nature of research into the links between environment and behaviour. He proposed that design could be recognised as having five characteristics. The first of these is that design consists of three elementary activities which Zeisel called imaging, presenting and testing. Imaging is a rather nice word to describe what the great psychologist Jerome Bruner called ‘going beyond the information given’. Clearly this takes us into the realm of thinking, imagination and creativity which will be explored in the next two chapters. Zeisel’s second activity of presentation also takes us into the realm of drawing and the central role it plays in the design process. This will be explored in later chapters too. Finally the activity of testing has already been explored here in Chapter 5.

Zeisel also goes on to argue that a second characteristic of designing is that it works with two types of information which he calls a heuristic catalyst for imaging and a body of knowledge for testing. Essentially this tells us that designers rely on information to decide how things might be, but also that they use information to tell them how well things might work. Because often the same information is used in these two ways, design can be seen as a kind of investigative process and, therefore, as a form of research.

Creativity:

These comments from Hertzberger suggests that we must be careful to draw the distinction between originality and creativity in design. In the competitive and sometimes rather commercial world of design, the novel and startlingly different can sometimes stand out and be acclaimed purely for that reason. But being creative in design is not purely or even necessarily a matter of being original. The product designer Richard Seymour considers good design results from ‘the unexpectedly relevant solution not wackiness parading as originality’ (Lawson 1994a). The famous

architect, Robert Venturi has said, for a designer, ‘it is better to be good than to be original’ (Lawson 1994a). Hertzberger, Seymour and Venturi all seem to be cautioning us against the recent trend to value the purely original-looking design without testing it to see if it really can fulfil the demands placed on it.

Some designers seem to work deliberately to generate a series of alternative solutions early on, followed by a progressive refinement, testing and selection process. Others prefer to work on a single idea but accept that it may undergo revolution as well as evolution. Either way round, simply waiting for one idea to appear seems unlikely to prove very successful. It often seems to be the case that our thought processes have a will of their own. Once we have had an idea or started to look at a problem in a particular way it requires real effort to change direction. Creative thinkers in general and designers in particular seem to have the ability to change the direction of their thinking thus generating more ideas. We will discuss techniques for doing this as part of the design process in Chapter 12.

In the experimental studies mentioned earlier both Eastman’s and Agabani’s results show the combined use of evolutionary and revolutionary modifications of early solutions. In the evolutionary phase the designer is really following his or her nose, gradually modifying the embryonic design as it is tested to see if it satisfies constraints and is found wanting. Eventually, unless the design proves totally successful, one of two things happens to halt this evolutionary phase. Either the general form of the solution reveals itself incapable of solving enough problems, or so many modifications have to be made that the idea behind the solution is lost and abandoned. In either case the designer is likely to choose the revolutionary step of starting a completely new train of thought.

Measurement and design methods:

Reference has already been made to Christopher Alexander’s famous method of design, which perhaps exemplifies the first generation thinking about the design process. We no longer view the design process in this way and in order to see why we shall pause here to fill in some detail. Alexander’s method involved first listing all the requirements of a particular design problem, and then looking for interactions between these requirements (Alexander 1964).

Designers and those who make design-like decisions which profoundly affect the lives of many people can no longer expect their value judgements to be made in private. Such large-scale design processes must clearly invite the participation of all those who will be substantially affected. However, we must not expect the design process to be as clear, logical and open a process as the scientific method. Design is a messy kind of business that involves making value judgements between alternatives that may each offer some advantages and disadvantages.

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The range of design techniques such as sketching, prototyping, mock-ups, scenarios, etc., enable the designer to make “an inquiry into the future situation of use.” These techniques “make the world a part of cognition”, and provide the designer with a set of “situating strategies.”

After producing many dozens of small sketches of details and concepts over several years, and experimenting with performance, using different engines in some existing small cars, the design work took a major step forward when Gordon and his team built a very simple, full-size mock-up of the car, using wire and cardboard. The final version of the city car bore a striking resemblance to that simple mock-up. The mock-up became a useful design tool, as it began to suggest some new possibilities. E.g. seating

arrangement.....another cost-saving idea also arose from exploring the mock-up, e.g. the rear-located engine could be accessed from inside the car...

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Designing out risk:

Prototypes are a low-cost, efficient way to ensure solutions work. One can start with very simple models — an early prototype of a hospital service, for example, might use chalk lines on tarmac to indicate wards. As each prototype reveals more about what works, iterations can become more like a finished product. By the time one arrives at final prototype or pilot, unintended consequences and risk of failure will usually have been designed out.

Later in the process, prototype models allow people to see how solutions work and try out alternatives.

Once a solution has been designed, it can be tested using prototypes. For a service, these will generally be simple, low-cost mock-ups of the service, allowing the designer to quickly and cheaply see what works for the user and what does not and then make improvements.

Prototyping can include everything from tiny, cheap cardboard models to large, expensive ones with working parts, but it also covers activities like role-playing and live testing. Services can be prototyped as a whole, but you might also simply prototype individual touchpoints, such as forms people have to fill out, web pages etc.

Design overcomes risk with prototyping. Distinct from piloting, which tends to be done on a large scale (e.g. a whole town or area), prototyping can be done at tiny scale initially, working up from, for instance, a cardboard house to a real house to a street to a town. This assumes some degree of initial failure, but sees it as “smart failure” from which learning can be applied to the next prototype, designing out risk with each iteration.

Traditional services, however they are reformed, are ill equipped to tackle the biggest health challenges we face. The current institutional approach based around the hospital infrastructure and its professional hierarchies and incentives is still organised to combat infectious disease. Supportive public health regulations are important, but rely on centralised control; they do not begin to encourage the active personal decision making which will ultimately promote good health. Chronic conditions, which are closely related to lifestyle need a wholly different approach—one which understands individual behaviours and motivations, involves the community and, critically, can address the socio-economic divisions which continue to underpin and determine lifestyle choices

The design technique of prototyping manages risk by starting small and designing out problems early — before significant public finances are committed and media attention is attracted.

A design-led approach can also ensure that new ideas are tested quickly and iteratively in collaboration with the right people.

Testing the findings: Community workshop and Advisory Board input The Design Council invited families and early years professionals who had played a role in the research to be involved in reviewing, challenging, and validating the research findings and emerging themes.

Rather than jumping straight to expensive and risky pilots, design process tests iteratively, starting with low-cost, simple prototypes and designing out risk as prototypes become more evolved.

Low-risk prototyping Design process tests solutions with low-cost, small-scale prototypes initially. It sees failure at this stage as “smart failure” that allows solutions to be improved and risk to be designed out as prototypes progress.

Prototyping The aim here is always to design risk out, so that by the time you reach a high level of investment, the risk is low. By starting with low or no-cost prototypes, one can learn a lot about what works and what does not before going on to more elaborate iterations and uncover consequences that would otherwise have been unforeseen.

New designs arising out of this work were developed through feedback studies in which progressive prototype iterations were tested with users.

A user focused design process will provide the framework for: testing in practice the ideas outlined in this paper; creating practical prototype solutions that demonstrate new organisational models and scenarios for future cocreated services; generating early policy recommendations that would support the formation of these new models and modes of development for the NHS, the Department of Health and the government.

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Qualitative, ethnographically-inspired research; highly open, interactive and tangible workshop formats; visualization and rapid prototyping; user testing redesigned services; these are in many ways novel approaches to policy and service innovation.

Facilitating the innovation process via creative, graphical tools such as concepts, scenarios, storyboards and prototypes.

Sabine Junginger, Kolding School of Design (DK), illustrated the classic policy process model: First, research, then analysis, then decision, then implementation. However, a design approach would be much more concerned with implementation (experience and impact for end-users) from the outset, and would – in line with Banerjee’s point – be driven much more iteratively.

Banny Banerjee, Stanford University (US), emphasised the power of design to oscillate between the micro and macro levels of public problems. This is done by combining in-depth understanding of policy consequences for people or business while enabling system-wide thinking, and then testing potential system redesign with users.

Design is rather more predisposed to iterative creation and stewardship, closing the gap between development of the ‘plan’ and its implementation into ‘practice’. Rather than formulating a strategy that is distinct from practical application, it is in the testing and iteration that the plan truly comes to life in relation to context, practical outlook and consequences for people.

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Specifically, these strategies usually include some combination of design methods – facilitated brainstorming, iterative design and quick prototyping, hands-on user testing – and pilot implementation with ongoing measurement, assessment, and documentation. These strategies engage disparate stakeholders (members of the public, front-line service providers, agency leadership, etc.), help in clarifying these users’ needs and motivations, and promote their alignment towards a shared goal.

The participating developers – all of whom had prior experience developing tools that assist with college – finding, comparison-shopping, data visualization, etc. – used their expertise to rapidly design and test a range of web and mobile applications that aim

to improve the evaluation of high school options. Through eight weeks of participatory design research, panels, and user feedback sessions with students and families, SCDC startups deepened their understanding of the challenge, alidated their ideas...

For the pilot, the informational materials will go through an additional round of user testing to evaluate the usability of all documents. The design team will work with HPD to design and facilitate the user testing.

HPD launched pilot programs to test the efficacy of the enhancements proposed by the project team to the agency’s materials and services. The Public Policy Lab fellows are providing design support during implementation. Support includes monitoring process and impact, and drafting interim and final evaluation reports.

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Working from July through September, the team rapidly iterated through clickable prototypes of a new Branchekode service, soliciting feedback from business owners and front-line workers along the way.

With limited resources the team adopted a prototyping approach almost by default, planning and delivering offerings on an ongoing basis with feedback and tweaks at regular intervals. Ideas for new services, partnerships, and programmes are tested at a small scale first and grown when successful.

Launching with a public beta helps manage expectations by offering fair warning that kinks are still being worked out and that failures will be responded to quickly.

Prototyping:

This practice has spread far beyond its origins in preparing products for manufacture. Today we have not only rapid prototyping of things, using new tools such as 3D printers, but also a new generation of prototyping approaches that allow fast, collaborative creation of systems and services. With all of them comes the idea that the best way to learn is to do, and that rather than spending years perfecting a new service model or strategy the fastest way to improve it is to do it on a small scale, and for real.

A strategic designer explores ways to de-risk propositions by testing them through partial prototyping or by modelling and simulation. This includes the use of scenarios, games, and role playing, as well as limited roll-outs of systems in the familiar style of alpha, beta, or 1.0, 2.0 etc. These mechanisms create virtuous cycles of self learning. The sooner one begins making models or prototypes, the better.

The Studio further sketched out the prototype of a new learning environment that could become the model for new schools in Finland.

With limited resources the team adopted a prototyping approach almost by default, planning and delivering offerings on an ongoing basis with feedback and tweaks at regular intervals. Ideas for new services, partnerships, and programmes are tested at a small scale first and grown when successful.

Prototype evidence:

Conduct small experiments to test hypotheses. Document the outcomes to help refine learnings and generate evidence to attract further funding or authorisation. The qualitative findings from this early research, as well as ongoing user testing, would be an essential tool used by the CFPB and IDEO to make decisions on an ongoing basis.

When doing something truly new, sometimes the only way to produce evidence that it will work is to test it out empirically. Experiments allow for important feedback loops within a project while simultaneously acting as powerful storytelling devices to build future constituencies, be they funders, partners, or participants. Concrete outcomes, well documented, are key to de-risking the next larger scale of development.

Improvements to the quality of the site can be judged by assessing the usability of the new site in comparison to one of the many it replaced. In one test GOV.UK was 40 per cent faster based on observed user testing

Alpha is the first usable version, though it may not represent the whole of the proposed software’s functionality; beta is the second major iteration which has full functionality though it may still have bugs, and both are followed by the release or final version. These phases are used for testing and iteration.

Launching with a public beta helps manage expectations by offering fair warning that kinks are still being worked out and that failures will be responded to quickly. Clearly marking something as under development serves as an invitation for users to offer their feedback and commentary on what works and what needs improvement, though it does put the onus on the host of the service to make feedback as easy and seamless as possible for users.

It is design’s ability to project new configurations that sets it apart from many analytical methods. In fact, I share the authors’ assertion that the complex systemic challenges we face today actually necessitate frameworks that are intrinsically capable of generating and testing entirely new approaches, and learning from their introduction to existing structures. Again, design is inherently drawn to working from this position too.

A strategic designer explores ways to de-risk propositions by testing them through partial prototyping or by modelling and simulation. This includes the use of scenarios, games, and role playing, as well as limited roll-outs of systems in the familiar style of alpha, beta, or 1.0, 2.0 etc. These mechanisms create virtuous cycles of self learning. The sooner one begins making models or prototypes, the better.

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Design thinking starts by understanding user needs in order to ensure solutions are appropriate, waste is avoided and end users buy into them.

This is the spine of the design-led innovation process. It is, as one can see, a joined-up process from analysis to problem solving to implementation. It mitigates risk while increasing the chances of success by using end user needs as a touchstone.

Meeting the real need:

User needs are a quick route to efficiency. By designing a service or policy around them, one can eliminate extraneous elements and cut costs.

The focus on the user, far from just being a methodology for a redesign, has been embedded as an active component of the service. Users can now offer feedback and suggestions at any time using a Good Kitchen postcard. These cards are read aloud at staff meetings and put up in the kitchens.

User needs are still the central concern and they still relate to systems and multiple departments.

As Ben Terrett, GDS Head of Design, says, the site was built with “a relentless focus on the user.” The team found that users engaging

with government services want simplicity and speed. “It’s about looking for the bones of the needs,” says developer Frances Ber-rima.

The front line of health care is not where professionals dispense their knowledge to patients but where people look after themselves, to prevent ill-health or cope with it. The biggest untapped resources in the health system are not doctors but users.

Our approach is human centred, involving users, business and service providers in the design process.

The design process is a set of techniques and approaches that puts users at its heart, works from their perspectives, engaging with articulated knowledge, latent perceptions and emotional responses. This set of techniques provides a language for dialogue that will be central to the co-creation approach.

Good design will ensure ‘user friendly’ interfaces that better support new services.

Design focuses on the user, and ensures that new ideas are transformed into products and services that appeal and succeed.

Design offers different ways to develop services around people’s needs, to work openly and collaboratively and to reduce risk through continual testing and improvement.

Our aim is to build design capabilities in the public sector by introducing new tools into policy development and creating more effective, people-centred services.

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Human-centred design has a role to play in order to pursue a better understanding of the implications of public sector interventions, revealing a more nuanced, illustrative and in-depth description of everyday human and social living.

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This document represents the first phase of a user-centered design project – what we call “Discovery.” User-centered design methods provide a means to understand peoples’ experiences and respond to them, in tangible ways.

The prompts are ideas that we think should be explored through the mechanism of design. The prompts are intended to generate feasible responses — things that can actually be implemented for use by families, kids, and guidance counselors.

It’s user-centered, meaning the lived experience of the users of the service is of the greatest interest in the design process.

User-friendly educational tools, along with community-based and in-person outreach mechanisms, may assist New Yorkers in successfully identifying and completing an application.

Enhance the application process for affordable housing by creating new, human-centered informational materials, encouraging hyper-local marketing by developers, supporting community-based “housing ambassadors.”

From the perspective of potential applicants, this information—its distribution channels and methods for interaction—can seem fragmented and impersonal. Therefore, there’s an opportunity to create more targeted and human-centered services to further assist New Yorkers applying for affordable housing.

Cost efficiency and quality of user experience could be improved for customers and government staff alike by using human-centred design to substantially upgrade an online service.

Based on previous experience a decision was made to follow a human-centred design methodology to create the new Branche-kode. Fieldwork and user involvement of business owners and government staff were again important sources of inspiration for the design proposal.

These objections dissolved over time as IDEO introduced their rigorous human-centred design process and “brand” came to be understood more broadly as a way of maintaining a coherent interface between the bureau and the outside world.

Like many startups, the team applied an agile development process paired with user-centred design, meaning that they work in a collaborative, multidisciplinary fashion. This allows them to structure their work into a series of iterative ‘sprints’, each achieving incremental development goals in weeks rather than months.

Under the banner of ‘user led design’ they’ve also taken some of the methods of social movements—like the disability rights movement—which have always involved people in need to shape new alternatives. Serious engagement with end users in this way invariably brings new insights to the surface, showing how apparently well-designed systems often fail to take account for the fine grain of daily life.

Design takes a middle path and is primarily concerned with appropriateness, understood as that fragile quality which is achieved when the best of human intentions are realized within the constraints of reality. Design is a culture that blends the concerns of science and the humanities to search for outcomes that are balanced and opportunistic, grounded in the real world but driven by human aspirations

For Sitra, strategic design enables us to explore this delicate combination of pragmatism with imagination: research through prototyping, learning from execution, communication through tangible projects, strategic intent with iterative action, systems thinking and human-centredness, all underscored by an optimistic belief in progressive change.

...including its ability to quickly develop multiple perspectives, to understand people, communities and societies.

Interviewing and shadowing professionals:

To supplement the family ethnographies and gain a services perspective, the Design Council and the Innovation Unit conducted in-depth interviews and spent over 20 hours shadowing early years professionals. The Design Council team also ran short ‘ideas sessions’ workshops with teams of professionals.

MindLab made a series of audio recordings of the young people’s reactions and played them at workshops to SKAT employees. The employees soon realised they had taken it for granted that the users would understand or figure out their language.

Lewisham commissioned a design agency to train Housing Options staff in video ethnographic research techniques, giving them the capability to better record, understand, share and get closer to the barriers users were experiencing. Video material was used in an ideas workshop to prompt service improvement suggestions from staff. This session alone generated around a hundred different ideas.

Specific real-life stories about citizens’ lives are a powerful tool for change. Successful human-centered innovation is built on the organisation’s ability to comprehend other people’s situations and needs and transform this “professional empathy” into new ideas

The citizens' stories:

Through the citizens’ stories you can ensure that the new solution is based on the true needs of citizens as existing problems become more specific and present when citizens themselves talk about their stories. In addition, this concrete and present element is part of ensuring both commitment and dedication from the project participants.

A rather systematic finding across the empirical data – all sixteen interviews – that the voice of the citizen, however it is captured through audio or video (but preferably by such ‘live’ media), is a crucial trigger for change. It can be termed ‘professional empathy’, because qualitative research seems to power an empathetic, engaging, but still professional, (re)connection between public service staff and users.

Consider the example of a family in chaos. One can capture what it feels like to be them, and to experience the problems and challenges of a dysfunctional family by simply living with them. Or one can capture it graphically by mapping the vast system of public and non-public organisations that leverage resources to try to help them. This is what I call “professional empathy”: The discipline of putting yourself in someone else’s situation, to explore how they experience what your organisation does to them. It is almost always an eye-opener, and it is usually the starting point of real change.

A focus in many public design approaches is developing and scaling services which rely more on empathy and trust. Design here involves creating and sustaining relationships and alliances around the specific problem or situation in the particular context

Government staff-people accompanied MindLab on these visits in a conscious effort to spread professional empathy throughout the coalition of organizations involved.

Focused ethnography was mirrored by a similar effort within the system to foster empathy towards users and administrators alike.

DBA sought out the front-line staff and spent time with them. Through observations and interviews with staffers and management, the team were able to understand Branchekode more empathically. These engagements enabled the project team to perceive the ‘seams’ of the system: the places where intervention or reinvention of services was possible

Frontline engagement had produced rich insights into a system that needed replacing. This would potentially enable a form of empathy within bureaucratic systems that often struggle with it...

MindLab favours audio because it captures the emotion of a situation while leaving room for interpretation by listeners. Audio files are useful in a variety of formats, from Power-Point to workshops, and strike a nice balance between effectiveness, cost, and speed. The team replayed the recordings in meetings and workshops with staffers at multiple levels inside the DBA, successfully fostering a sense of professional empathy.

Seeing the frontline through the eyes of our users helps in a number of ways. It may refine your initial perceptions of a system as you take a more empathic point of view.

The ‘right’ attitude for strategic design:

It began with a sense of empathy that made the team sensitive to the needs of our guests, resulting in shifting our focus from formatting guests into an event, to shaping an event around guests and patterns of human behaviour. Empathy feeds inquisitiveness and the desire to know why things work the way that do.

Information that is critical to frontline stakeholders might be invisible to national decision-makers, for instance, so using scalar thinking is a way to be sceptical of a situation, see it through the eyes of others, and target your inquiry to uncover the relationships between big and small.

The research activity enabled families, children, early years professionals and other key stakeholders to contribute their experiences, perspectives, and ideas to the work.

To inform, raise interest and engage a diverse range of stakeholders in this programme.

A series of community launches were held at locations across Southwark and Lambeth to kick-start The Knee High Project. The aim of these sessions was to raise awareness of the programme in the local area and to generate interest. We sought to engage local families living in either Southwark or Lambeth and with one or more children aged below five years, as well as early years professionals.

Design thinking starts by identifying user Needs and goes on working with users throughout the process to co-design and test solutions. This means that what it delivers not only works for the people affected, but that these people own and promote the new measures.

User engagement:

Designers use a wide variety of techniques to understand user needs, including interviews, user diaries and observations of behaviour. Designers will also often work with ethnographic researchers to gain user insights.

We argue for a new approach which we call co-creation since a set of new relationships between users, workers and professionals lies at its heart.

In the new approaches we are urging—communities of co-creation—the key is to build up the knowledge and confidence of the users to take action themselves in new partnerships with professionals

People will only feel empowered: to participate in the creation or uptake of a new service if it speaks to them in a language they understand and in a style that is found to be friendly and appealing.

Users play a far larger role in helping to identify needs, propose solutions, test them out and implement them, together.

Services are jointly designed by users, frontline workers and professionals through a process of dialogue that goes beyond the initial perspectives of any one party. Co-creation is not a one off event, like a referendum in which the community decides what should be done. Developing services that promote health will take more time. Nor is co-creation just a question of formal consultation in which professionals give users a chance to voice their

views on a limited number of alternatives. It is a more creative and interactive process which challenges the views of all parties and seeks to combine professional and local expertise in new ways.

Engaging in this way encourages risk sharing and an informed discussion about trade offs and priorities. Users are no longer left infantilised and demanding ever more services, rather they are informed and emotionally engaged, allowing them to participate in critical decision making processes.

Good design process focuses on the inter-relationship between users, workers, professionals and services—the challenge for effective co-creation.

Interviewing and shadowing professionals:

To supplement the family ethnographies and gain a services perspective, the Design Council and the Innovation Unit conducted in-depth interviews and spent over 20 hours shadowing early years professionals. The Design Council team also ran short ‘ideas sessions’ workshops with teams of professionals.

This community workshop gave the research teams an opportunity to present their findings, and gave the community an opportunity to respond – letting us know whether we’d got it right or wrong.

User needs, sometimes through co-design with ordinary citizens.

Professional expertise will play a critical role in preventative and lifestyle programmes, but that expertise needs to support more distributed and co-created solutions, with medical professionals working alongside other disciplines and users.

User involvement will only get so far when connecting to services that are modified versions of traditional top down delivery models. Professionals and users could achieve a huge amount, working together, if they operate within a new framework

MindLab proposed that a wide group of users and stakeholders should be included in the development of the policy through co-design, i.e. shared development of solutions in collaboration with experts, policy developers, companies, universities and organisations

The design process involves end-users in a number of different ways, from taking active part in the research phase (rather than as mere research subjects), to contributing to the development and testing of prototypes. The entire design process is often highly iterative, experimental and emergent.

Employees at the Retention Centre are currently working on integrating the many different aspects of cases involving those who have suffered an industrial injury. They hold roundtable discussions where the person who has suffered an industrial injury can meet with their employer, trade union and municipal case worker to find long-term solutions.

A focus in many public design approaches is developing and scaling services which rely more on empathy and trust. Design here involves creating and sustaining relationships and alliances around the specific problem or situation in the particular context.

Citizen engagement aims at opening up new avenues for empowering citizens to play an active role in service design, service delivery and, perhaps most importantly, the ongoing process of service Innovation.

...Hired a professional design team to facilitate a different kind of dialogue between management, staff and the citizen-users. In a joint project with Local Government Denmark (an interest organization for municipalities) and the service design firm '1508', the managers and staff at Camillagaarden were trained to apply design approaches such as cultural probes, photo diaries, prototypes, service analogies, testing and ideation to explore new ways of involving and engaging citizens. Through the year-long use of design in Camillagaarden, Christina Pawsø and her staff began to build a different kind of relationship with the users. The highly interactive methods allowed citizens to visually articulate their hopes, dreams, aspirations and concrete personal stories.

The design process involves end-users in a number of different ways, from taking active part in the research phase (rather than as mere research subjects), to contributing to the development and testing of prototypes. The entire design process is often highly iterative, experimental and emergent.

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As designers, we try to identify factors that make a process feel engaging and meaningful (or not). Then we can design ways to actively support more engagement and meaning during the evaluation stage.

Through eight weeks of participatory design research, panels, and user feedback sessions with students and families, SDCD startups deepened their understanding of the challenge, validated their ideas, and pivoted their products to enhance the choice experience.

A co-design process is one in which the intended users of a service play a key and repeated role, participating in iterative prototyping and evaluation that helps to tailor responses to their actual needs. We expect that this approach may give rise to variegated and locally adapted responses.

Interview sessions and co-design workshops were organized to identify information gaps, areas of confusion, and "pain points" in the current process, and to gather insights to inform and inspire design solutions.

These co-design exercises were intended to identify challenges in the affordable housing application process, generate ideas for enhancing service provision, and rapidly prototype and test proposed solutions.

Co-Design With Stakeholders Public Policy Lab fellow Kristina Drury captures insights from staff of affordable housing developers and NYC HDC at a September 2012 workshop

The first could be called a co-design approach – more intensively involving members of the public and front-line service providers in research, prototyping (the making of preliminary models for the purpose of subsequent refinement), testing, and implementation of services to be administered by public agencies.

Specifically, these strategies usually include some combination of design methods – facilitated brainstorming, iterative design and quick prototyping, hands-on user testing – and pilot implementation with ongoing measurement, assessment, and documentation. These strategies engage disparate stakeholders (members of the public, front-line service providers, agency leadership, etc.), help in clarifying these users' needs and motivations, and promote their alignment towards a shared goal.

Key findings about the public's experience of the application process for affordable housing — and the agency's needs and constraints — were identified through a series of research and co-

design activities, led by a team of Public Policy Lab fellows.

The project team's primary research methods were qualitative and participatory. The research and design process was split into two phases; see Part 1 for a description of the project phases. In both phases, the team created and facilitated a series of exercises with stakeholders to ensure that the proposed pilot plans were realistic and useful.

During and subsequent to these stakeholder engagements, the project team created multiple, sequential versions of most aspects of the proposals and the supplemental resources.

INFORMATIONAL MATERIALS: INSIGHTS FROM PARTICIPATORY DESIGN Participant insight, captured during design workshops

HYPER-LOCAL MARKETING: INSIGHTS FROM PARTICIPATORY DESIGN The following recommendations resulted from one-on-one interviews, group conversations, and workshops with community members, community-based organizations that work with potential applicants, and housing professionals (including developers and HPD staff).

Co-Creation Meeting with Staff at a South Bronx CBO Staff members at a community organization in the South Bronx discuss their challenges when helping applicants.

Co-Creating the Process Map Several participants in a co-creation workshop with a South Bronx CBO discuss pain points in the application process and design solutions that resolve their...

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These initial meetings used techniques such as eyes-closed visioning sessions where surgeons were asked to imagine and narrate and role-play their process in slow motion. Other activities gave participants a forum to share their aspirations and apprehensions, all with a focus on the familiar procedures of surgery.

These early conversations would play an important role later in the process as the HHC sought to design to the observed and expressed needs of

Video observation, role playing, and conversations about analogous items were used by HHC to slow down the fast paced, intense decision making environment of the operating theatre and insert the possibility to carefully question the status quo, catalyzing new opportunities for redesign of previously invisible failure points.

Workshops were held with different segments of the Quinta Monroy settlement to give individuals the opportunity to express themselves in situations where they would feel free to be honest about their preferences, even if those choices differed from their immediate neighbors or family members

Fig. 4 Future owners were involved in the design process through a series of workshops. These sessions included the group making difficult choices about what to build now and what to leave for later. As construction began, the workshops focused on how the owners would be able to make best use of the new homes and expand them safely. Source: Elemental

Frontline engagement had produced rich insights into a system that needed replacing. This would potentially enable a form of empathy within bureaucratic systems that often struggle with it but

Government staff people accompanied MindLab on these visits in a conscious effort to spread professional empathy throughout

the coalition of organizations involved. They also participated in workshops afterwards to synthesise the insights

Fieldwork and user involvement of business owners and government staff were again important sources of inspiration for the design proposal

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A series of discussions and activities guided the workshop participants to add to the insights and emerging themes. Scenario cards and storyboarding allowed participants to explore opportunities for design and where they felt that design could have the most impact on child development outcomes.

Create an expectation within services that it is the norm to involve the network around a family. Measure success based on the breadth and depth of the relationships around a service user

Workshops were conducted with senior citizens and all other relevant parties, including kitchen staff, using idea development methods such as "radical analogies". This inspires new ways of thinking by referencing something that is different but similar – in this case a restaurant and a meal service for a family with children. Kitchen staff were asked questions such as, "What if the senior citizens were paying guests in a restaurant?"

To develop this concept the team asked 250 representatives of public and voluntary sectors organisations to make a proposal for how they could contribute to the coalition. The only requirements were that they collaborate and share data.

Lewisham commissioned a design agency to train Housing Options staff in video ethnographic research techniques, giving them the capability to better record, understand, share and get closer to the barriers users were experiencing. Video material was used in an ideas workshop to prompt service improvement suggestions from staff. This session alone generated around a hundred different ideas.

We need systems that allow people and patients to be recognised as producers and participants, not just receivers of services. Such a distributed system would have to operate close to people, dispensing continuing support, non-medical as well as medical knowledge, and be highly adaptable to people's different and emerging needs. Services would be configured around the user not the institutions into which they are forced to fit.

Distributed and collaborative approaches will only be effective if they enable co-created services. At the heart of the approach is a new role for users who will no longer be just on the receiving end of services. Instead they will be vital to the design and delivery of services, working with professionals and front line staff to devise effective solutions.

Co-creation is vital to win the engagement that Wanless calls for. Cocreation allows people to tailor solutions to their local and distinct needs. Critically a co-creation approach sees those who participated in the design of the service committed to its implementation. Interaction and dialogue cannot be just talk, although some users will find it cathartic just to have their views heard. People who are consulted about services feel let down when no action is taken. Co-creation should commit producer and user to a joint plan of action.

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definitions of co-production have been offered. Dr. Edgar Cahn defines co-production as a framework and set of techniques used

by social service organizations to enlist active client participation in service programming. Boyle and Harris describe co-production as "delivering public services in an equal and reciprocal relationship between professionals, people using services, their families and their neighbors

Co-production promises this by leveraging other resources than those of the public sector. I explore this as "the growth of new and different ways to involve users of social services as co-producers of their own and others' services.

The outside-in view of user experience that is provided by design exposes the entire network of actors, including citizens, who can potentially take part in value-creation. Normann & Ramirez characterize this as a process of reconfiguring, so that actors come together to co-produce value via what they call not a value chain, but a 'value constellation'.

Many of the ideas developed in these workshops – such as a new shop to sell the crafts and goods they produced, or a programme to give some of the proceeds to cancer research—were quickly turned into practice. These initiatives massively increased the user satisfaction and quality of engagement with the service, and as they saw the concrete changes, their appetite for more increased.

we must take a close look at the specific behaviours, experiences and resources which characterise the citizen or company, and then identify which actors and endeavours already exist in their proximity. We refer to the result of this process as co-production: i.e. when we design and organise public services together with citizens rather than deliver public services to them

Success in co-production requires an awareness of other actors who are already making a contribution to carrying out the tasks set by public authorities, and of the fact that there may well be even more participants who have the potential to contribute. This requires public organisations to plan their activities based on strategic considerations of which types of partnerships with citizens, relatives and organisations can have the greatest positive impact.

Working with co-production therefore requires a close partnership with professional staff, while at the same time constantly asking whether other professional skills are necessary or whether employees should be trained to take on new tasks.

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The DOE can engage with a variety of partners in designing around these prompts. Here we've specifically considered partnerships with technology developers, as well as with stakeholders directly through co-design processes.

"Design." During this phase, the project team – policymakers, designers, and key service participants – work together to expand on the prompts identified in discovery. Typical design activities include further ideation, rapid prototyping, and testing, all carried out in multiple iterative cycles. The results of a design phase could include refined, production-ready prototypes and plans for pilot testing and evaluation.

co-production process, where end users design and implement their own service programs, enabled and supported by public agencies. In both cases, the goal is for members of the public to receive more effective and satisfying services, while reducing public resource requirements.

take collaborative service production a step further – to help agencies develop programs that facilitate effective citizen-led

service efforts. Even when they succeed, these social innovations are often fragile and highly localized. In order to flourish, co-produced services often require a level of public support. To endure and spread, citizen-led initiatives benefit from technical assistance, material support, rules, and directions from government agencies. Instead of acting only as providers of public services, agencies can also act as enablers of collaborative efforts that respond to the emerging needs of citizens.

Interview and workshop participants were asked to propose solutions that emerged from their own lived experience and expertise. The project team was able to observe and respond to information gaps, areas of confusion, and “pain points” in the current process. Participants included developers of affordable housing, staff at community organizations, New York City residents, applicants to HPD’s affordable housing services, HPD leadership, and front-line agency staff.

Co-Creating the Process Map Several participants in a co-creation workshop with a South Bronx CBO discuss pain points in the application process and design solutions that resolve their

Co-production means delivering public services in an equal and reciprocal relationship between professionals, people using services, their families, and their neighbors. Where activities are co-produced in this way, both services and neighborhoods become far more effective agents of change. David Boyle, Co-Production: A Preventive Welfare System, April 2012 Lecture

It’s co-creative, meaning that all the service’s providers and users, from upper management to front-line staff to end-users, should be engaged in the design process

The project team’s primary research methods were qualitative and participatory. The research and design process was split into two phases; see Part 1 for a description of the project phases. In both phases, the team created and facilitated a series of exercises with stakeholders to ensure that the proposed pilot plans were realistic and useful.

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DBA and Statistics Denmark sat together to formulate text that use easily-understood language while still satisfying the official descriptions. By doing this the team were able to satisfy the multiple bottom lines at stake in a service like Branchkode. The new version works well for users while also providing accurate statistics.

Finally, involving members of the frontline in the design process brings their intelligence and experiences into the project and gives them purchase with a solution that will ultimately impact their work. When people have actively contributed to the development of a new design solution they are more likely to adopt the eventual outcome

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In-depth research: Ethnography We commissioned the Innovation Unit to undertake in-depth ethnographic research with local families. The team spent over 200 hours with families who were carefully selected to ensure we had a representative diversity of experiences, backgrounds, beliefs, attitudes, and ethnicity

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design is rather more predisposed to iterative creation and stewardship, closing the gap between development of the ‘plan’ and its implementation into ‘practice’. Rather than formulating

a strategy that is distinct from practical application, it is in the testing and iteration that the plan truly comes to life in relation to context, practical outlook and consequences for people

Whereas design is often thought of as a consultant activity, or as particular methods, design can also be thought of as a management style.

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COPEC’s stake brought strategic leadership and stewardship to Elemental with deep business experience as Chile’s largest private corporation to back it up. Stewardship would be critical to Elemental’s long-term success since the reform of social housing would be a “marathon, not a sprint” as the market forces that dominate housing in Chile will shift only very gradually and the success of new solutions would unfold over time

The purpose here is to begin codifying the practises of innovators who are consciously rethinking institutions to better meet the challenges of today. We describe this as stewardship: the art of getting things done amidst a complex and dynamic context. Stewardship is a core ability for agents of change when many minds are involved in conceiving a course of action, and many hands in accomplishing it

The challenge of stewardship in the context of social innovation is somewhat larger—it’s about changing the ‘weather.’ The combined weight of laws, vested interests, and “the way we’ve always done it” can feel permanent, like forces of nature, but these are expressions of a dominant culture. We have to constantly remind ourselves that institutions and the systems they form are the accumulation of human decisions previously made (or abdicated). As such, those same choices can be made differently tomorrow. Or today, for that matter.

we described stewardship as feedback loops that guide the why, what, how, and who.

We invoke stewardship in place of words like “implement” and “execute” out of recognition that the latter imply a cleanliness or linear progression which is rarely found when working on a shared proposition in a complex environment. Inside a factory plans can be executed, orders implemented, and outcomes delivered but innovation that engages with the messy reality of the social sphere do not happen so neatly. What we describe also goes well beyond “facilitation,” which suggests that others do the important work. Stewardship shapes the course of innovation; it is not a neutral role

Think of stewardship as a form of leadership. One that acknowledges things will change along the way for better or for worse, therefore demanding agility over adherence to a predetermined plan. Many individuals who work in alliances or collaborative endeavors act as stewards almost naturally. If you are used to continually calibrating the goals of a project with the constraints of your context, you are practicing stewardship. If you maintain a constant state of opportunism and a willingness to pivot when progress on the current path is diminishing, you’re a natural steward.

In today’s world there often remains a separation between thinking and doing or analysis and execution. By linking stewardship to design practise we mean to underscore the importance of integrating both into an ongoing process.

As strategic designers, we often found ourselves acting as the ‘glue’ that binds together multiple types of expertise, multiple approaches, and multiple forms of value in a team working towards a coherent proposition

successful stewardship: creating neutral ground for new ideas; disrupting expectations; and creating a sense of urgency; as well as addressing the need to create evidence, awareness and approvals necessary for change to happen

Stewardship is the art of aligning decisions with impact when many minds are involved in making a plan, and many hands in enacting it.

While the design flowed rapidly, stewarding the solution involved finding a way beyond an impasse arising from the collaboration of different professions and the cultures of decision-making they entail. Research had shown that the legal tone of the writing on Branchkode.dk was stifling users’ ability to use the site properly. The potential upside to be gained from the adoption of more colloquial language was strongly argued by the design proposal, justified by the field-work insights and easily accomplished on a technical level. One part of the client consortium that empathised with the users felt strongly that this was a clear win. From the perspective of potential downside, however, changing the language represented risk for another part of the client consortium.

Snowplough (case: gov.uk)

An individual, usually in a leadership role, who works ahead of (or above) the core project team to proactively clear organisational obstacles out of the way. When done well, the person playing the role of snowplough bears the brunt of engaging bureaucratic issues before they become a drag on the momentum of the core project team.

The HDL studio offers one model for filling in the gaps. While we are pursuing strategic design as a way to frame challenges, define opportunities and steward their implementation, this book touches only briefly on stewardship. This is a reflection of Sitra’s current experience in applying strategic design, which consists solely of early-stage efforts (such as the Studios) as the logical starting point.

STEWARDSHIP

Feedback loops that guide the why, what, how, and who

Within architecture for example, persistent development from strategy to plans and through the stewardship of implementation is what leads to a good building

The need to develop a coalition of organizations and individuals who work together to implement the proposals that come out of a process like an HDL Studio is one reason why stewardship is so important. This includes being realistic about what can be handed off and carried out by someone else independently, what should be done together, and what requires occasional tweaking on the difficult road through vision, intent, plans, implementation and, ultimately, achievement.

Without the broader stewardship arc, the design process is easily all about thinking and not doing

Bridging the gap between analysis and execution can be an unusual role within many organizations, though not to the practice of design. By being involved in stewardship across both it is possible to close the feedback loop between problem and solution, thereby giving the strategy a self-learning mechanism that creates a degree of intelligent flexibility.

Successful design does not end with good ideas. It also involves bringing people together to convert ideas into actions, which is the role of stewardship

Today’s challenges are as much about vision as they are about designing the transition to accomplish that vision. As such, the opportunities are the critical hinge between the way things are

now and how things could be. Together these two outcomes form a bridge between current realities and a projective future, reinforcing the importance of stewardship and integration within strategic design.

and to blend strategic intent with a focus on the quality of execution, for example—presents us with a potentially valuable tool for addressing the future with sensitivity and ambition.

Overcoming the roadblocks along the way was enabled by abilities in integration, visualisation and stewardship which form the core of the strategic design skill set.

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Additionally, some of the professionals who did engage found it difficult initially to think beyond their day-to-day roles, and imagine what might be possible. They needed a lot of support from the researchers, and from design tools to extract their thoughts from the constraints of their reality

Facilitate ways for all service professionals to visit places and people who are successfully innovating in early years. Taking inspiration and learning from best practice examples outside of your field of work is a good way to see how things can be done differently

Designers do not seek to supplant other areas of expertise; rather, their techniques facilitate multidisciplinary teamwork. Teams might include representatives from different government departments or agencies, but also experts in fields such as behavioural economics. Designers’ visualisations help these teams understand problems collaboratively and synthesise their insights into viable solutions. They get often disconnected individuals and teams working together.

Multidisciplinary teamwork While acknowledging that there can be profound structural barriers here, design offers highly effective ways of assessing which departments, disciplines and individuals are relevant and a wide range of proven techniques for helping multidisciplinary teams collaborate.

Multidisciplinary teams Design-led innovation is never about designers supplanting other areas of expertise. Designers facilitate collaboration between stakeholders, synthesising their ideas in sketches and prototypes. Design teams can include end users, people from different departments and experts from disciplines such as ethnographic research and behavioural economics.

Helsinki Design Lab (HDL), working more methodically to define a design approach to policymaking, also saw designers as facilitators – and learners. In their teams of experts and policymakers, designers were very much in the minority. No designer hubris here.

staffed with a team of ethnographers, designers and public policy specialists. It was not supposed to develop policy, but use design methodologies to coordinate project teams

There were two designers and their main role was to coordinate and synthesise the conversations and engagements

The role of professionals and front line workers will similarly undergo transformation. Professionals will act as facilitators, mentors, and sources of knowledge needed to help users devise and manage their own solutions.

Design then is a critical process that facilitates the combination of knowledge and expertise that will underpin the new co-created services. Collaborative design techniques can harness the

knowledge of frontline staff in improving services. The NHS Institute for Innovation and Improvement facilitated creative workshops for frontline teams at Luton and Dunstable NHS Trust, allowing staff to apply design approaches to service improvements. The sessions were facilitated by designers which helped staff to understand how their ideas might work in a service design context.

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WORKSHOP FACILITATION Workshop facilitation is used when you need to involve a lot of people in the project. It may be that you need ideas, inputs, knowledge etc. of a particular group of people. By facilitating a workshop you ensure that you obtain the necessary knowledge.

The implication for design practice is that designers must continue to develop and strengthen their ability to conduct in-depth user research and to facilitate processes with clients and stakeholders to activate their “professional empathy” and help turn the eye-openers into real change

hired a professional design team to facilitate a different kind of dialogue between management, staff and the citizen-users. In a joint project with Local Government Denmark

Facilitating the innovation process via creative, graphical tools such as concepts, scenarios, storyboards and prototypes;

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Specifically, these strategies usually include some combination of design methods – facilitated brainstorming, iterative design and quick prototyping, hands-on user testing – and pilot implementation with ongoing measurement, assessment, and documentation. These strategies engage disparate stakeholders (members of the public, front-line service providers, agency leadership, etc.), help in clarifying these users’ needs and motivations, and promote their alignment towards a shared goal

In both phases, the team created and facilitated a series of exercises with stakeholders to ensure that the proposed pilot plans were realistic and useful.

For the pilot, the informational materials will go through an additional round of user testing to evaluate the usability of all documents. The design team will work with HPD to design and facilitate the user testing

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This project will have many focuses from new concepts and products to facilitating an ongoing discussion with experts from many fields under the Forum on the Future of Surgery

the forum would coordinate the stakeholders, the issue at hand and multiple levels of authority.

The success of the forums hinged on meticulous preparation, careful facilitation and according to the team, total intellectual honesty with citizen-participants. Difficult, complex issues were discussed in common sense terms by the team because experience showed that the public was highly sensitive and quick to make a judgment about the forum’s credibility

In advance of the studio week, the assistants prepared a mapping of key stakeholders from all sectors by placing the elderly in the center and radiating out through all strata of public and private services and relationships

By playing a supportive role you also gain the freedom to focus on the relationship between the Studio team and your own organization.

ensure that you are orchestrating the ongoing documentation of the Studio. Most importantly, you are there to keep track of the overall aim and goals of the Studio as it relates to a larger arc of work.

Design Lead: Being a leader means knowing when to listen and when to ask for help, and being able to break deadlocks by making a confident decision

The Design Lead’s job is to keep the Studio focused and moving. In some cases this includes stepping in to make decisions when differing opinions amongst the Studio team are inhibiting the synthetic process. In this manner, the Design Lead role is more active than that of a facilitator

In contrast to a facilitator, the designers are part of the team rather than outside of it. They are expected to bring their expertise and experience to the table by actively contributing like everyone else. This includes guiding the synthesis process as well as being able to comment on the cultural and social consequences of material decisions.

Design is the Glue The pair of strategic designers work as synthesizers amongst a group of peers. It is their job to ensure that the conversation is balanced and holistic

