

CRAFTING A CHANGE

SERVICE DESIGN PERSPECTIVE FOR SUSTAINED BEHAVIOUR CHANGE

A thesis submitted in partial fulfilment of the
requirements for the Degree of

Doctor of Philosophy

By

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Declaration

It is certified that the work contained in this thesis entitled “*Crafting a change - Service Design perspective for sustained behaviour change*” has been carried out by me, a student in the Department of Design, Indian Institute of Technology Guwahati under the guidance of Prof. Ravi Mokashi Punekar and Prof Pramod Khambete (External Supervisor) for the award of Doctor of Philosophy and that this work has not been submitted elsewhere for a degree.

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Certificate

The research work presented in this thesis entitled "*Crafting a change - Service Design perspective for sustained behaviour change*" has been carried out under our supervision and is a bonafide work of Mr RAVI MAHAMUNI.

This work submitted for the degree of Doctor of Philosophy is original and has not been submitted for any other degree or diploma to this institute or any other institute or university. He has also fulfilled all the requirements including mandatory coursework as per the rules and regulations for the award of the degree of Doctor of Philosophy of Indian Institute of Technology Guwahati.

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Dedication

This thesis is dedicated to the memory of my beloved father, late Shri Hanmant Mahamuni. He has always been the source of my inspiration and motivation to pursue my education, although today he is not with us to see my achievements. This is for him. He always told me that life is a journey to become a good human being.

This thesis is also dedicated to my beloved mother, Smt. Kusum, considerate wife Aarati and wonderful kids Atharv and Riddhi, who have been my best cheerleaders throughout this journey and source of positive vibes. They have meant and always continue to mean so much to my happiness.

I also dedicate this thesis to my friends, colleagues and close relatives, especially sisters, brother, parent-in-laws, sister-in-laws and brother-in-laws, who have supported me throughout the process. I will always remember what they have done, especially my team, for helping me and stepping up for the office work wherever possible.

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In 2015, after 18 years of experience, I realised that I lacked the academic rigour, the in-depth knowledge research and the exchanges with fellow practitioners without any commercial restrictions that a PhD could bring me. While doing a PhD part-time is not easy; the advantage was that I was well funded and resourced to do research as well as support my family, which I want to acknowledge here. When you embark on a PhD journey, you need a friend, philosopher and guide. I am fortunate to have all these attributes in Dr Ravi Mokashi Punekar (Professor at the Department of Design, IIT Guwahati) and Dr Pramod Khambete. Both guided me through all the ups and downs of my research journey and have shown immense faith in me. Without them, it would not have been possible. Whenever I felt emotionally and mentally drained, a quick discussion with Ravi sir, who is always so calm and composed, helped me reduce stress and anxiety. I wish to thank all the members of the Doctoral Committee, including its Chairman, Dr D. Udaya Kumar (Associate Professor and Head of the Department, Department of Design, IIT Guwahati), and board member/s Dr Sougata Karmakar (Associate Professor, Department of Design, IIT Guwahati) and Dr Bodhisattva Sengupta (Associate Professor, Department of Humanities and Social Sciences, IIT Guwahati) for their continuous support in their evaluation, directions and motivation during this research. Their inputs have helped me a lot in my PhD research journey.

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Abstract

Services and technologies are continuously evolving, and new solutions are continually being designed, tested and implemented. However, it is often that service users and stakeholders are either slow in adopting new service interventions or may not be using the services regularly or are even resistant to use them. Behavioural theories have been rejuvenated in recent years by economists looking for ways to explain numerous biases in economic choices. Taking into account the role of behaviour change early in the process of problem-solving can help understand and facilitate stakeholders' behaviour and increase the chances of new solutions being adopted and becoming successful. It is especially true in the Service Design life cycle. However, Service Designers are not fully utilising behavioural knowledge due to a lack of coherent and actionable guidance.

The CraftChange Framework is a simple, pragmatic integrated framework for combining Service Design with behaviour change. The CraftChange Framework enables designers to address the concerns of relevant stakeholders to increase the likelihood of a service getting implemented. It enables the Service Designer to be mindful about sustainability concerns and a human touchpoint's soft concerns during the Service Design life cycle and design for the progression of service users' long-lasting behaviour change.



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1 Introduction

1.1 Background

Services are dynamic, unfolding over time through a sequence of events and steps that create value for the customer (Bitner, Ostrom, & Morgan, 2008). Designing of such services is an evolving discipline where Service Designers adopt a customer-centric perspective, holistically addressing all components of the service system – human, technology and business - aiming to create desirable experiences (Moritz, 2009). Service Designers envision, systematically plan and choreograph unique solutions.

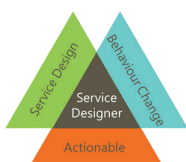
The Service Design discipline has by now proven its usefulness. However, businesses, at times, lack the confidence to invest in deploying novel service concepts that call for service users' adopting new ways. The reasons could be that the concerns of all the stakeholders, most importantly, the service provider's concerns, have not been addressed adequately, or that the Service Design realisation is not viable. Along with the service user as the primary stakeholder, the interests of other stakeholders such as the service provider, associated human touchpoints, society and environment need to be well balanced. If the perceived cost of providing the services is prohibitive, then the service provider will not implement or continue with the service. Alternatively, if the human touchpoint's concerns are not taken care of adequately, they may not continuously give excellent service experience (Mahamuni, Khambete, & Mokashi-Punekar, 2018) unless of course, it is possible in both instances to demonstrate that the tangible and intangible value proposition surpasses the costs.

Service Designers often wonder, why is it the case that users are either slowly adopting services or even resist using them; why are designed services not being regularly used by the users despite their satisfaction while having used the service previously, and despite the service being user-centric, why do the interventions not make the expected sustained impact. On similar lines, there are other questions that arise, such as why Service Designers do not fully utilise knowledge of behaviour change and why sustainability issues are still not considered adequately, and so on. Answers to these questions seem deeply rooted somewhere in the Service Design life cycle. Most new services need people to acclimatise to new ways of doing things (behaviour change). The purpose of our research presented in this thesis has

been to explore the possibilities of offering a framework for designers who can use the proposed tools to incorporate suitable elements of behavioural change in the services and thereby address some of the above questions.

Let us consider some case examples of Service Design. Waste management is still a global concern. Significant efforts have been made in major cities across the globe – from New York to Cape Town, and from Beijing to Lima - to manage behavioural changes in usage patterns (refuse, reduce, reuse) and disposal practices (recycle). Despite these efforts, reports suggest that 45% of waste in England still ends up in landfills (Cooper J. , 2016). In India, the ‘Swachh Bharat Abhiyan’ is one of the most noteworthy cleanliness campaigns initiated by the Government of India. Reports show that it still has not made the anticipated sustained on-ground impact (Down To Earth, 2019) (The Economics Times, 2016). There are many causes for the slow uptake of recycling and waste management solutions, and human behaviour is one among them. Other examples in Service Design are problems such as, Airbnb rentals turning neighbours into a nuisance (Malazizi, Alipour, & Olya, 2018) (Williams, 2016) or vandalism issues of shared bikes all over the world seem to be deeply rooted in the behaviour of users (Te Pai & Pai, 2015) (Wynn, 2018). It is evident from these examples that Service Design is becoming increasingly involved in the design of public services and business services. There is an opportunity to include behaviour science in the design process so that the solutions are more effectively adopted by business users, citizens and societal actors. It appears that the prevalent Service Design methods and techniques do not comprehensively and explicitly consider behaviour change considerations. The objective for us is to enrich the Service Design process by making it more cognizant of human behaviour aspects. This consideration can prove to be an essential aspect, particularly in services that have social relevance, and which influence a change in people’s behaviour on a significant scale.

Service Design and Design for Behaviour change are relatively new and evolving disciplines. Economists have, in recent years, been closely looking at behavioural theories to explain numerous biases in economic choices. Today, the design of artefacts, communication and processes is increasingly seen to either exploit or counteract such user biases to ensure socially desirable behaviours. For instance, in the Service Design of an annual payment of taxes, the challenge is to address and ensure that not only do citizens pay their taxes on time regularly, but also to adopt a systematic approach that enables them to interact with tax authorities whenever the need arises. A crucial challenge emerging in policymaking is to find ways and means that help to encourage and sustain more permanent transformations in behaviour.



Stages of Change model (SoC), famous as the Transtheoretical Model (TTM) (Prochaska & Velicer, 1997); the Precaution Adoption Process (PAP) (Weinstein, 1988); and the behaviour wizard (Fogg & Hreha, 2010) are among the theories that have addressed behavioural change over time. Understanding the various stages

of behaviour change may help to know why the interventions are not effective in making sustained behaviour change. Unfortunately, the well-trodden methods of user-centric design often do not ensure sustained behaviour change as expected. Designers often tend to overlook the need for developing solutions that adapt over time to the anticipated behavioural changes in service users. Designers do not seem to be fully utilising behavioural theories due to lack of knowledge and coherent actionable guidance (Niedderer, 2014) (Mahamuni, Khambete, & Mokashi-Punekar, 2018). The stages of behaviour change, as indicated by TTM or PAP models, may help to map the user progression. Some organisations, like Behavioural Insights Network in the UK, are working actively on utilising behaviour insights in policymaking and their recommendations are getting integrated into the development of numerous public services (Behavioural Insights Team, 2014). However, such initiatives do not appear widespread.

Currently, the integration of behavioural theories and design is highly dependent upon the individual's knowledge about behaviour change principles and frameworks. Behaviour scientists have collaborated with designers in the past in developing various toolkits. This research examines the ways and means required for behaviour change knowledge to integrate into and influence the different stages of Service Design practice - starting from user research till detailing the design interventions. It draws from models rooted in behaviour theories, psychology, sociology and behavioural economics fields in its attempt to address and balance the needs and concerns of multiple stakeholders involved. It utilises the behaviour change principles by taking into consideration the various stages of behaviour change in the development process of the Service Design.

In this thesis, the researcher presents the methodology, plan and outcome of experiments that take a transdisciplinary approach to Service Design and behaviour change. It has resulted in proposing a novel framework that Service Designers could use that takes into consideration the transdisciplinary relationship between behavioural science and Service Design.

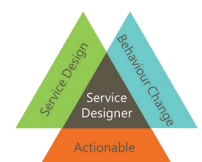
1.2 Motivation

“Design is not just what it looks like and feels like. Design is how it works.”

Steve Jobs (2017)

“Recognizing the need is the primary condition for design.” - Charles Eames

These quotes summarise what the researcher is passionate about, what the researcher is doing and aspires to do in the future. The researcher had been investigating human values and Service Design for a couple of years before pursuing the PhD journey. Service Design provides a holistic view of keeping the user at the centre and 5010506 human life. Inherently it has a direct or indirect impact on people's



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lives and hence their behaviour. The researcher believes that, if designers look at Service Design more strategically and approach it by understanding and influencing people's action, it will help to sustain behaviour change.

The researcher got inspired by the culturally-rooted concepts related to personal experiences. According to Buddhism

“Experiences are ‘anicca’, i.e. ephemeral, arising and passing away every moment. One cannot create an experience for somebody else, but can only provide the facilitating conditions.” (Buddhism 500BC),

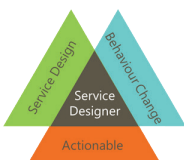
Prima facie it looks like service experience, which is intangible and ‘anicca’; and it gets co-created at the time of interactions and which cannot be stored or transferred. It applies to Service Design and can act as one of the guiding principles. As per Buddhism (Buddhism 500BC) (Goenka S. N, 2015) to internalise anything, it goes through three kinds of wisdom (the learning process):

“suta-maya panna-wisdom gained by listening to others, cinta-maya panna-intellectual, analytical understanding and bhavana-maya panna-wisdom based on direct personal experience”.

These guiding principles inspired the researcher to look at behaviour change induced by Service Design as progression, starting from making people aware of the service until they experience it the first time and then internalise it.

The researcher got the opportunity to interact with Prof. Uday Athavankar and Prof. Pramod Khambete as part of the Service Design research project under the aegis of Tata Consultancy Services (TCS)—IIT Bombay Research Cell. TCS, India funded this research project, and the researcher was one of the principal investigators from TCS. Both professors played a crucial role in impressing, motivating and guiding the researcher regarding Service Design. It led to the researcher's decision to further his research interest by joining the formal PhD programme in Service Design.

Popular services in our daily life, such as app-based cab services, online retailers, online bill payments and online money transfers, had induced some or other changes in consumer behaviour. These behaviour changes are happening in an intended or unintended way. The researcher's thoughts were revolving around the thought: can this be done systematically by designing services for deliberate behaviour change? The researcher has also experienced that doing a onetime behaviour change is relatively easy, but for sustained behaviour change, it requires additional focus and effort. This is applicable while persuading people to behave in more environmentally and socially responsible ways.



All the above circumstances, challenges and dearth of knowledge motivated the researcher to investigate Service Design for sustained behaviour change, deeply. The researcher wanted to explore Service Design for behaviour change, specifically with ethical considerations and by making the available behaviour change knowledge accessible in a form to make it actionable to Service Designers during the Service Design lifecycle. Due to extensive industry experience, the researcher wanted to have a primary focus on making the knowledge actionable for practitioners. He also wanted to address sustainability and environmental issues while designing service interventions as a step towards becoming part of the core business strategy. The researcher is an inseparable part of this work but chose to write the thesis in the third person to keep his standpoints separate from the research observations and outcomes. These industry insights were gained over a long journey beyond his PhD-related activities, and were built upon the researcher's various practical experiences and industry background.

1.3 Research Space

Service Design is all about making life easier and more delightful for users over a longer duration or making the world a better place to live in (Hanttu, 2015). As part of this endeavour, in this research, an attempt is being made to focus on understanding approaches to evolve design-led behaviour change methodologies for Service Design that aim to enable sustained behaviour change among all primary stakeholders' perspective. It is anticipated that review methods and techniques for behavioural change can be blended for envisioning, reflecting and projecting new approaches to Service Design in the specific domain by anticipating emergent social and technical trends. In an organisational context, it is required that designers work in tandem, be collaborative and make the whole process participatory when engaged in Service Design projects. Towards meeting these needs, the outcome of this research is mainly aimed at creating knowledge for Service Designers, when they are engaged in designing services aimed at creating behaviour change. We believe that unless this knowledge is made actionable, it will not benefit the Service Designers in an intended way. This forms the primary scope of this research, as shown in Figure 1.

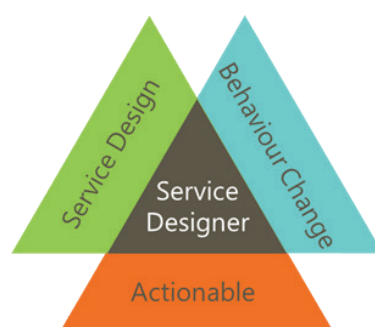
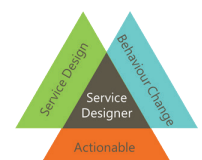


Figure 1. Research Space



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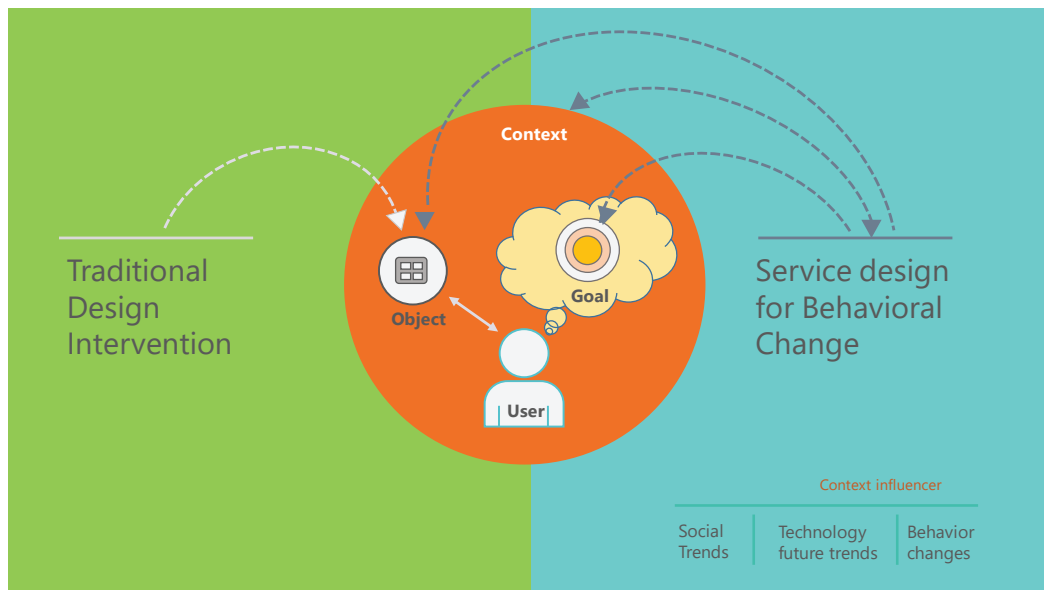


Figure 2. Service Design Perspective

Generally, in conventional design interventions, the primary focus remains on the objects, i.e. products. However, as shown in Figure 2, in Service Design for behavioural change, there is a need to consider not only the objects, i.e., the products but also the context and the goal of the user. The context influences decisions in Service Design, and service in operation influences the context for which it was designed. The context, however, is often affected by societal and technological changes, and these, in turn, bring about behaviour change. Here the objective of Service Design can result in a change in behaviour, which in turn may symbiotically change the context for which it was designed. This interdependence indicates that Service Design for behavioural changes is an iterative process and needs multiple iterations for one-time behavioural change, short-span behavioural change and sustained long-term behavioural change.

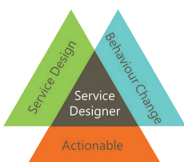
1.3.1 Scope of Research Enquiry

The initial research enquiry with which this research endeavour started was to seek “*how to design services for sustained behaviour change*”. The following are articulated as the preliminary scope of research enquiry as the direction of research.

[E₁] – What are those **aspects of sustained behaviour change** that can be influenced by a ‘Service’?

[E₂] – What must be the **desirable characteristics of services** for sustained behaviour change?

[E₃] – What is the **process of designing services** with the above desirable characteristics derived under [E₂]?



1.3.2 Keywords

Service design, behavioural change, sustained behaviour, design framework, multidisciplinary, collaborative, participatory design, distributed cognition, stakeholder engagement, co-designing, co-creation, user involvement, social trends, technological trends.

1.4 The structure of the Thesis

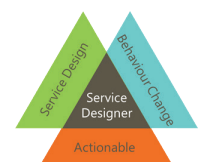
This section explains the structure of the iterative nature of this research. It highlights the structure as an ‘*Onion peeling*’ endeavour, in which the different stages of different studies and experiments have been undertaken. Each of these stages is articulated under different Chapters in this thesis. This thesis elaborates the research journey supported and discussed with reflections, output and outcomes, that have culminated in proposing an actionable framework that Service Designers can use in their projects in Service Design.

The ‘Introduction’ (Chapter 1) covers the background and motivation for this thesis research. It also explains the research space identified from the motivation and then details the direction for research enquiries to understand the scope of this research in-depth.

Moving forward on the direction set by the research enquiries, the ‘Service Design and Behaviour Change Overview’ (Chapter 2) provides the foundation for this research. It gives an overview of approaches in the design of products, experiences and services along with their evolutionary shifts over time. It particularly highlights the shifts in approaches to Service Design. It investigates the role of behaviour change, human values and distributed cognition in Service Design. It also explores the role and influence of ethics while designing for behaviour change.

It is very crucial to identify the significant research gap in Service Design and to set the goal and scope of this research clearly. ‘*Research Gap Analysis*’ (Chapter 3) using a multipronged approach forms the basis for pursuing this research. The research gaps were identified by undertaking a literature review; undertaking an organisational case study to understand how non-designers engaged in Service Design are currently practising it and undertaking a survey of Service Design practitioners across the globe. This ‘*Research Gap Analysis*’ drew insights from these multiple alternative sources to identify significant gaps that helped to frame the research questions.

Considering the nature of this design research, the ‘*Research Methodology*’ (Chapter 4) examines and identifies the best-suited research methodology for the different research experiments for the three research questions.



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Further, the primary objective of this research is also to culminate the knowledge gained against the different research questions into an actionable proposal that would empower Service Designers to use such knowledge in practice.

Hence, action research was identified as appropriate for this research and it was planned to use the '*Plan-Act-Observe-Reflect-Refine*' cycle in the course of the iterative stage of this research. As part of this iterative methodology, the framework assessment was planned through self-reflection, reverse case study mapping, practitioner interviews and multiple formative and summative studies. We have tentatively coined the proposal as - '*CraftChange*' Service Design Framework - as a guiding principle to engage with the participants and seek their early feedback, during the different experiments.

It is anticipated that the *CraftChange* Framework would have three main components, viz. Knowledge Framework; Process; and Toolkit. 'Development of *CraftChange* Knowledge Framework' (Chapter 5) follows the iterative conceptualisation methodology with the '*Plan-Act-Observe-Reflect-Refine*' cycle. There was a total of seven iterations which have resulted in three main components of the *CraftChange* Knowledge Framework, i.e., Empathy Square; Intervention Matrix and the Behaviour Change Progression Model.

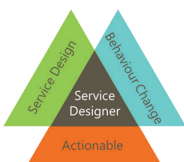
'Assessment of *CraftChange* Knowledge Framework' (Chapter 6) was undertaken through three formative studies which include two reverse case study mappings and one social sector practitioner interview. The Summative study provided the necessary logical closure for the Knowledge Framework.

The 'Development of *CraftChange* Toolkit' (Chapter 7) follows a design methodology similar to the phase model of the Product Design Process and the FBS Framework. Through the '*Plan-Act-Observe-Reflect-Refine*' cycles, various Cards and Canvases were envisaged as part of the Toolkit.

The 'Development of *CraftChange* Toolkit' (Chapter 7) needs to be viewed together with 'Assessment of *CraftChange* Toolkit' (Chapter 8) as part of the cycles for multiple formative and summative studies. The *CraftChange* Toolkit evolved through a total of six iterations.

The 'Discussion and Future Work' (Chapter 9) elaborates reflecting on the overall research endeavour. It outlines the contributions to knowledge and practice. Considering that a PhD has its limitations, this chapter identifies future work to take this work forward.

The 'Conclusion' (Chapter 10) sums up the thesis highlighting the key contributions and experiences.



2 Service Design and Behaviour Change - An Overview

This Chapter gives an overview of approaches in the design of products, experiences and services along with their evolutionary shifts over time. It particularly highlights the shifts in approaches to Service Design. It investigates the role of behaviour change, human values and distributed cognition in Service Design. It also explores the role and influence of ethics while designing for behaviour change.

2.1 Introduction

“Man is a wanting animal and rarely reaches a state of complete satisfaction except for a short time. As one desire is satisfied, another pops up to take its place. When this is satisfied, still another comes into the foreground, etc. It is a characteristic of the human being throughout his whole life that he is practically always desiring something.” (Maslow, 1970)

Individuals have a momentary sense of satisfaction, for instance, when they get their dream job or buy their dream home, but soon enough, they start wondering when the next promotion will come or when they will move into a bigger home. They quickly adapt to their new realities and create a ‘*new normal*’, and then they want more. They reach the top of a hill only to realise that it was just the base of another, larger one and they start all over again. This tendency in human nature of always desiring something has led to various problems. These multiple problems faced by human beings can be classified as Survival Problems, Financial Problems, Socio-political Problems, Relationship Problems, Religious Problems, Knowledge Problems and Psychological Problems (Ohamdeo, 2012). These classes of problems are interlinked, fuzzy and complex, and may need systematic problem-solving approaches. The entangled nature of human beings, their desires and difficulties, necessitate the idea of systems thinking to deal with associated complexity, fuzziness and interdependency. Systems thinking is a method of thinking about and understanding phenomena, and a holistic world view of human problems to understand, analyse and synthesise (Peralta & Rodriguez, 2014).

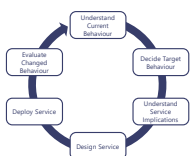
As stated by Albert Einstein, *“The problems cannot be solved using the same level of thinking that created them.”* One often requires a new perspective to transcend a problem. Hence, there is a need for all-inclusive and broader attention to the whole ecosystem rather than the problem itself, which System Thinking provides. Human problems are typically situated in a context, where multiple surrounding systems’ interaction are affecting each other, and need a broader perspective and systematic problem-solving approach of systems thinking. Systems thinking is even considered as a world view that sees things as being holistic and interconnected rather than a mere science-based problem-solving method (Maani, 2001). The characteristics of the systems approach are identified as inter-relationships or compositions; interconnections or emergence; inclusive, unifying and integrating; holistic inquiry; observer-dependent; multidimensional and mutual (Nelson & Stolterman, 2012).

To help people meet their desires and seek solutions to problems, designers are designing various products and services. These products and services are evolving continuously. Designers survey the users and by using their received feedback, improvise their product and/or service. Simplistically, designing is all about problem-solving. It is an intentional creation of a plan that can be implemented to solve a problem or more than one problem at a time.

Jonas has an interesting perspective on the problem-solving approach. He felt problem-solving is becoming less central in design due to the complex, fuzzy, non-predictable and pluralistic nature of issues that the designer needs to deal with. He advocates the need for design tools and methods for *“the description and analysis of complex problem fields”* (Jonas, 1996). Apart from this, a designer needs to address the ever-changing needs, expectations, desires and experiences of society. It is being observed that designers tend to start thinking from the problem-solving to the systems thinking perspective when faced with challenges (Peralta & Rodriguez, 2014). It needs to be noted that systems thinking does not replace problem-solving but complements it with a holistic and broader attention. The Design Council’s Transformation Design RED paper highlighted these aspects succinctly as:

“A number of design groups have broadened the scope of design to include disciplines such as interaction, experience and Service Design. All of these demands a holistic approach, a level of systems thinking, a focus on individual behaviour, and the orchestration of a range of different design inputs”
(Burns, 2006).

Society and sustainability-related problems are generally considered as complex and fuzzy problems. It is evident that by solving just one part of the problem may not provide a sustainable solution. There is a need for a more systemic design intervention directed towards creating a new ecosystem. Being truthfully holistic is difficult, but the intentions should be to look at a problem in a broader and more interconnected perspective (Stickdorn, 2000). Lately, ‘Design Thinking’ has become a widespread



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preoccupation as an active driver of user-centric business development. However, it also often faces criticism for its lack of integration with business and for being away from market realities (Brautigam, 2018). Thus, the main steps of ‘Design thinking’ are the ability to frame the problem, analyse the problem and finally, generate the solution according to the identified requirement. At each of these stages, a set of well-defined processes is to be followed. Designing such processes is an integral part of problem-solving. The kind of holistic approach deployed leads to a comprehensive solution. The aim of problem-solving can be said to explore a set of possible solutions for a problem and to select the most effective solution.

The journey of the problem-solving process results in the design of products, services or experiences, depending upon the nature of the problem and the underlying need. This, in essence, forms the approach to this research.

2.2 Developments in Design of Product, Experience and Service – some current deliberations

Design has a long tradition and has evolved from attention to the product; to the experience and now lately, to the service. It is essential to understand these journeys and their differences. It is not only about the process, but it is also a reflection of the designer’s mind-set towards problem-solving.

2.2.1 Product, Experience and Service - some definitions

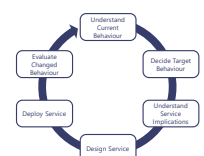
A simple meaning of ‘product’, according to Dictionary.com is

“an article or substance that is manufactured or refined for sale or a thing or person that is the result of an action or process” (Oxford).

So, the product is an entity that serves a need or purpose. Products are primarily designed to satisfy the requirements of their target users. Every product has features and functions that can be beneficial to its customers, which motivates the customers to buy the product.

Whereas the definition of ‘service’ is:

“the action of helping or doing work for someone or a system supplying a public need such as transport, communications, or utilities such as electricity and water” (Oxford).



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A service is a continuous act performed to satisfy demand. It is a complete system which is developed to provide a solution to a given problem or to improve the existing solutions. Services evolve through a sequence of events and steps that produce value for the customer (Bitner, Ostrom, & Morgan, 2008).

Both Products and services are designed to solve a problem or provide a solution. While the primary purpose of products and services is the same, they have some striking differences too.

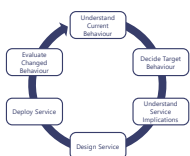
The key feature of the product is that it is tangible, whereas a service is intangible. The customer determines the quality of the product and the service provider determines the quality of the service. The customer care perspective of the product is less as compared to that of a service. It is easy to compare the quality of products, but the quality of services of different service providers is challenging to compare.

Customer experience is at the centre of any product or Service Design. The dictionary definition of 'Experience' is:

“practical contact with and observation of facts or events OR an event or occurrence which leaves an impression on someone” (Oxford).

Suppose one places an order for their child's birthday gift on a online retail store, and one expects timely delivery of a quality product with good packaging. If any of these expectations are not met, one says the experience was not good, and while placing the next order, one thinks twice before visiting the same portal. So, essentially, satisfying customer needs is not the only requirement of Service Design; giving customers the best experience is equally, if not more, important.

Services nowadays dominate global economies and economic growth. Along with the rising importance of services, they are becoming much more complicated with the developing technologies and shift in customer expectations. Traditionally, services are thought of primarily from the service management perspective, where operational characteristics of services such as efficiency, effectiveness and the smooth flow of the process are given importance during their design. Now, there is a need to consider services primarily from the customers' and then service providers' perspective. Service providers can no longer compete exclusively by only providing superior value through their main products; instead, they must move towards creating meaningful and memorable customer experiences as their differentiator. Service providers, particularly social ventures, must shift the focus from operational qualities of services to customers' unstated needs, aspirations and what they value in their lives (Mahamuni, Sharma, Khambete, & Mokashi-Punekar, 2017). Due to cut-throat competition, companies have to consider user experience to realise products or services that are chosen and used by people for the long term (Akasaka, Ohno, & Yasuoka, 2017). Nowadays, mere functions may not provide the required



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competitiveness to stay relevant in this ever-competitive environment.

2.2.2 Directions in Designing of Product, Service and Experience

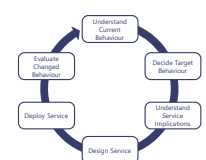
Products mainly aim at fulfilling the need for a consumer satisfactorily. Consumers associate themselves with products through several characteristics such as form, functionality, feel, aesthetics, appeal, perceived affordance, material, life, environment-friendliness, variants, value, durability, reliability, packaging, quality, standardisation, affordability, fabricability, maintainability, safety, marketability, install-ability and features (Wagle, Mahamuni, & Mehta, 2019).

In light of the complexity of the problems faced by humans, as suggested by (Licklider, 1960), the designer must effectively leverage the power of computers to augment human intellect in a manner that will open up new and creative avenues of problem-solving. Our interactions with computers are getting transformed by “*the end of interface stability, the growth of techno-dependency, the growth of hyper-connectivity, the end of the ephemeral and the growth of creative engagement*” (Harper, Rogers, Sellen, Human, & others, 2008). In light of these developments, Liam Bannon has called for a reorientation of the HCI field to make it ‘centred on the exploration of new forms of living with and through technologies that give primacy to human actors, their values, and their activities’ (Bannon, 2011). It brings out the need to understand the issues holistically and most notably, the human values involved during designing human interaction. In the associated human-computer interactions field, the need to make human values central to the interaction design is emerging (Friedman, Kahn, Borning, & Huldtgren, 2013) (Mahamuni, Kalyani, & Yadav, 2015). In today’s world, it is critical to make a stronger impact on the relationship between people and technology at multiple levels and hence one needs to look beyond HCI.

“*The intention to design the user experience is but the latest in a progression towards the user becoming the subject of design.*” (Redström, 2006). Service Design takes it further, and hence it is ‘a socio-technical system of the service user, for the service user and by the service user’. It also encapsulates the value co-creation aspect.

“*Tell me and I forget. Teach me, and I remember. Involve me and I learn*”
Benjamin Franklin.

This essentially forms the philosophical foundation for the participatory Service Design process in this research. It proposes to engage the service user and other stakeholders in the Service Design process to have them contribute meaningfully and effectively to the proposed service solution. The participatory Service Design process helps the team in building empathy towards users as well as stakeholders.



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It also helps to have a close look at their problems and concerns. Since knowledge is distributed in time, location, and across human and non-human agents (Hollan & Kirsh, 2000), concepts of the distributed cognition need to be used during the participatory Service Design process. It is explained in detail in section 4.3.1.

Although there are well-established protocols in the User Experience Design, in reality, experiences by their very nature are ephemeral. They get co-created at the time of interactions and in essence, they cannot be stored or transferred. From a designer perspective, experiences can be categorised as (Polaine, Løvlie, & Reason, 2013).

'User experience – user interaction with technologies'

'Customer experience - experiences with retail brands'

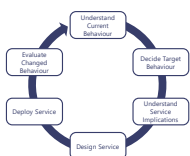
'Service provider experience - what it is like on the other side'

'Human experience: the emotional effect of services that impact the quality of life and well-being'

All these experiences are the result of some interaction; it may be between human-to-machine or human-to-human or human-to-environment. An understanding of the contexts in which these user interactions take place is the key to developing a seamless service experience. It is increasingly getting evident that services pertain more to performance and hence a designer needs to create the performance stage along with the required props.

Due to the economic and industrial shift from a traditional goods-centred dominant logic (G-DL) to emerging service-centred dominant logic (S-DL), product designers have expanded their scope of activities to move towards Service Design. Product designers in current times are building on their current skill set, and these include *"a user-centred design approach, a variety of qualitative and quantitative research and data gathering approaches, and visualisation techniques such as sketching, imagining and prototyping"* (Miettinen, 2011).

The main characteristics, such as variability, simultaneity, perishability, inseparability and intangibility, make services distinct from products (Taura & Nagai, 2009). The complexity and number of interactions, static and dynamic character, scope, tangibility, relationship with problems, and relevance of differentiation are the critical criteria which differentiate the products and services (Peralta & Rodriguez, 2014). In general, the product highlights its functionality based on the user's perceived affordance, irrespective of the functionality that the product has been designed for. However, the same does not apply to service. A service designed to cater to a specific need cannot have any perceived affordance. The affordances can be an excellent differentiating factor between a service and a product and offer an opportunity to be investigated further through case studies (Wagle, Mahamuni, & Mehta, 2019). The most identifiable factor of service over product is that services



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are dynamic, intangible in nature, and have higher complexity. It demands a new type of thinking which product designers need to adopt for the design of services (Peralta & Rodriguez, 2014). There is a reason to believe that there is an inherent difference between Product Design and Service Design. Service Design follows a holistic approach which spans across time. Products generally tend to be one-time individual isolated transactions. Service Design due to its holistic approach seems best suited to address even complex issues such as, introducing behaviour change.

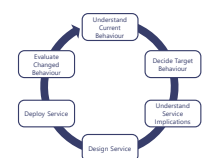
The complexity of the services needs an ecosystem to address it. It is being observed that services often *“harbour a complexity that can be compared to systems in nature”* (Peralta & Rodriguez, 2014). Services are also identified as systems in which *“customers and services interact through many different touchpoints during the customer journey”* (Clatworthy, 2011). Considering service as a system opens scope for the way services are designed. This co-existence of product and services that address this complexity becomes product service systems (PSS) (Nicola, 2002).

Object design was previously confined to the boundaries of form, function and production. However, nowadays, the central aspect of object design is to focus on the interaction between people and technology. It focuses on user experience and serves as a platform for service offerings. The shift from product to services is an outcome of many factors. The general awareness amongst designers about environmental issues has increased. Also, the worldwide expansion of the internet and the development of interactive technology has played a fundamental influence on the shift. There is also *“an on-going trend in social and government environments towards user and citizen centeredness”* (Peralta & Rodriguez, 2014).

Table 1 provides the summary of the focus of product design, interaction design and Service Design on various aspects such as a focus on objects, human centricity, the context of use, duration of use, systems approach and process of value creation. It gives a quick comparative picture of their focus areas.

Service Design takes into consideration a systems approach and is generally called a service system. Service system design aims to provide an all-inclusive service. The designer aims to not only satisfy the needs of the consumer but also to design a service which is cost-effective for the provider. Service system involves considerations involving people, process and touchpoints.

As part of Service Design, the designer needs to identify non-human agents who are influencing our lives and give them appropriate consideration. Since the objective is to create a holistic system, the designers must think of all aspects of the problem. Leaving any one of the aspects out of the Service Design might result in an accurate but ineffective system. Solving just one part of the problem may not provide a sustainable solution. There is a need for a more systemic design intervention directed towards creating a new ecosystem. A change in approach to Service Design



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Table 1: Design Focus for Product Design, Interaction Design and Service Design

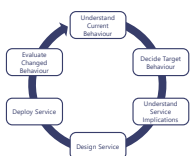
Design Focus	Product Design	Interaction Design	Service Design
Objects	Yes	Yes (Interaction objects)	Yes (Touchpoints)
Human Centricity	Indirectly	Yes	Yes
Context of Use	Indirectly	Yes	Yes
Duration of Use	Long (product life)	Short (Interaction session)	Long (Service Relationship)
Systems Approach	No	No	Yes
Process of Value Creation	No	No	Yes

brings in a revolution in the results the service might fetch. When the designer focuses more on systems thinking, than mere problem solving, it results in a more robust and viable system. It is imperative because the system's thinking enhances the problem-solving capability of the system.

2.3 Contemporary Trends - A shift from Product, Experience to Service Design

In the current times, there is a distinct shift from Products to Services, which can be summed up as '*ownership shift*'. Let us illustrate this with the help of a few examples below.

1. In olden days, washing clothes by hand was the only choice people had. They would often wash their clothes down by the river. It would be a tiresome task. Later, the Laundry technique came into the picture, and people started going to the laundry for their service. Laundry cleaners would collect dirty clothes from the customers, do the laundry and deliver the clean clothes back to the customers. With the advent and boom in technology, the conventional laundry technique was replaced by washing machines, where a shift from service to product happened. Washing machines accelerated the process of washing



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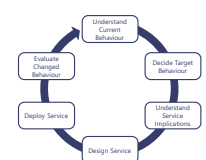
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clothes by a great extent. However, in the present situation, owning a washing machine for washing clothes has become an overhead. However, laundry cleaners have adopted this new technology to optimise their business. As a result, people have started availing of the service of washing their clothes at laundries again, where a shift from product to service has again happened.

2. Means of mobility - In olden days, people used to prefer the local transportation options for their commute. This idea was replaced by the idea of owning a personal vehicle, for instance, a car. Soon, people started buying cars and managed their commute on their own. However, with the increase in the traffic caused by a vast population, this method started fading out. However, as technology progressed, mobile app-based cabs came into the picture. With the help of this system, people started travelling to nearby and well as distant places using the App resulting in a shift from owning a product to availing of a service to achieve the same goal of mobility. It assured a safe and hassle-free journey. This new system provides a rating system where commuters and drivers can rate each other. This feature in the system has resulted in a change in the behaviour of the drivers, making them more polite and cautious towards the passengers. They offer guaranteed rides, keep the cars clean and provide a sense of safety to their customers. Their solution ensures their passengers have a safe journey by allowing the passengers or their well-wishers to track the ride. An emergency button is provided to ensure that passengers are assured. Likewise, it gives the drivers a fair chance to rate the customers. Depending on the ratings provided to the customers, the service provider offers various discount coupons to the customer.

3. Money and Banking - Earlier, when traditional banking methods were practised, people used to have a tough time going to the bank to complete their transactions. It was the time when customers were always hustling around in the bank, and the system was not properly structured. When the Online Banking facility came into the picture, it changed our lives. The benefits that one gets from Online Banking are plenty. These benefits can be enjoyed by both the Service Provider (Bank), and the Customers. Online Banking helps customers to save time and make the process hassle-free. It makes the process more efficient as multiple customers are assisted at a time. Customers can avail of the service from any location and do not have to go to the bank for that. It is an example of how technology helps to improve the overall service experience.

Along with location-independence, the Online banking service also provides paybacks and discount offers to the customers. It helps them gain faith in online banking, and they get proper, satisfactory treatment from the bank. On the other hand, Online Banking helps the Bank to reduce the workload at branches and keep their records up to date. Along with that, it helps them to manage and optimise their staff. The bank is also enabled to offer more



Overview

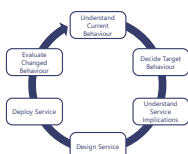
efficient and faster services to its customers.

4. Entertainment - Apple Inc. provides a wide range of computers and smartphones including a wide range of smartphones, tablet computers, mp3 players, and various accessories required with these products. Apple's products are considered flawless, and anything the company manufactures is considered world-class. For all these years, one has identified Apple by the products the company manufactured. However, recently, Apple announced its entry into the online digital entertainment section. Apple has decided to enter the market of online video streaming by creating exclusive shows in association with Hollywood veterans, thereby expanding its services offerings beyond the App Store and iCloud. This step from the world's leading manufacturer of category-defining gadgets signals a fundamental shift in its business.

These current trends show that with growing access to technology, improved connectivity and holistic awareness about societal and environmental impact, there is a changing trend in the ownership concept of products. Consumers are fulfilling their needs by avoiding ownership of a solution but are opting for contractual access to a solution (Wagle, Mahamuni, & Mehta, 2019). The need for the shift from product to service may be driven by business or consumer. Some businesses have stopped their offer of perpetual product licenses and moved on to their offer of 'pay per use' or 'annual subscription' basis. In reality, society, business and industry, and the overall business economy are experiencing a shift towards services leading to continuing 'conceptual shift' from a traditional goods-centred dominant logic (G-DL) to the emerging trend in service-centred dominant logic (S-DL) (Vargo & Lusch, 2004). In general, dominant logic (DL) is a strategic way of thinking that results in the primary source of profit-making for business and industry.

Multiple factors influence this shift from product to service. This has resulted in "the increasing development of technology, the emergence of new business models, government agendas for the development of services, and changes in people's mainstream thinking and values" (Peralta & Rodriguez, 2014). The general awareness amongst designers about environmental issues has increased. Also, the worldwide expansion of the internet and the development of interactive technology have had a fundamental influence on the shift. It is being suggested that the current trend in the start-up phenomenon is also one of the influencing factors that embody this transition from product to services (Peralta & Rodriguez, 2014).

Young (2008) summarised, "*The shift in focus from product and artefact-centred design theory to the system and service-oriented thinking has followed the advent and growth of services in our economy and society accompanied by corresponding changes in technology*".



The existential reason for the services is to create value for service users and meet their stated or unstated needs. These values can be categorised as care, access and response. How these values are delivered defines the performance of the service in terms of experience and as value (Polaine, Løvlie, & Reason, 2013).

2.4 Service Design and Behaviour Change

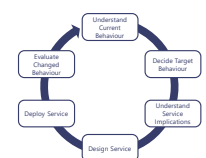
“Design is not a style. It is not about giving shape to the shell and not giving a damn about the guts. Good design is a renaissance attitude that combines technology, cognitive science, human need, and beauty to produce something that the world did not know it was missing.”

Paola Antonelli, senior curator of the Museum of Modern Art (Lockton, 2013).

Referring to the domain of product design, Stanton and Baber (1998) state that “[i]n designing products, designers are also designing user activity, which does not occur independently of the product... consumer behaviour is shaped by products as much as products are shaped by consumer behaviour.” There is growing recognition that designers are in the business of behaviour change (Lockton, 2013). It is applicable not only for products but also for Service Design. Kolko (2010) goes so far as to suggest that “the purpose of the [interaction design] profession [is] to change the way people behave”. ‘Behaviour’ is not easily extractable as a discrete component from the usage phase of a product life cycle.

Recent research regarding user behaviour suggests that a lot of voluntary benefits can be derived from nudging users’ behaviour and the way they interact with products (McMahon & Bhamra, 2012) (Tukker, et al., 2008). The way users interact with products is strongly affected by the way they are designed (Norman, 1988/2002). It provides designers with an opportunity to develop products in such a way that they will be used in the most sustainable ways. This realisation has resulted in the development of a research field, often referred to as Design for Sustainable Behaviour (DfSB) (Pettersen & Boks, 2009). Considering people’s interaction with products, Jelsma (1999) introduced the script concept (Akrich, 1992) in her research on DfSB for reducing environmental impact. This field has subsequently been pursued and explored for more than a decade now (Bhamra, 2004) (Lilley, Lofthouse, & Bhamra, 2005) (Rodriguez & Boks, 2005). It has resulted in the formation of an active research community working on the subject of DfSB where several PhD theses have emerged (Lilley, 2007) (Lockton, 2013) (Pettersen, 2013).

The subject of research has been on the identification of several strategies or principles that explore how products can be designed to affect behaviour (Lilley, 2007) (Lockton, 2013) (Tang, 2010). The application of these principles and strategies are also reflected in several studies (Daae, Goile, Seljeskog, & Boks, 2016) (Desmedt, Vekeman, & Maes, 2009) (Tang & Bhamra, 2012).



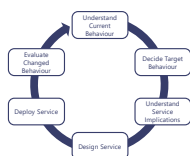
Overview

There is a recognition that today's multifaceted recurring social and business challenges are behavioural and need a holistic solution. However, there is a lack of evidence about how behavioural insights can be successfully applied during a Service Design to address these challenges (Carvalho, Jun, & Mitchell, 2017). There is also a need to systematically engage participants in intervention design to enable active participation from a behaviour change perspective. A similar need is also mentioned in healthcare services while improving their overall quality (Carvalho, Jun, & Mitchell, 2017).

Traditional design interventions for problem-solving often focus on the need for designing a specific product, merely guided by the design brief that encompasses only a few aspects of the known problem. Products generally tend to one-time individual isolated transactions. Behaviour change plays a crucial role in quality improvements and hence seems appropriate for Service Design, because *"quality will only improve where the behaviour of individuals within the system changes and this has to date often been ignored or underplayed in quality improvement efforts."* (Boaden, 2009). It is very much applicable for services since human beings are involved.

There is an inherent difference between product design and Service Design that needs to be factored in. Considering their benefits for design, can the approaches that have evolved from DfBC be extended to Service Design?

Services evolve through a chain of events and steps that co-create value for the service user (Bitner, Ostrom, & Morgan, 2008). Design of these services is a service-oriented user-centric activity of orchestrating people, infrastructure and communication as a holistic socio-technical system (Fensel, Facca, Simperl, & Toma, 2011). Service Design is a holistic approach which spans across specific time. The general tendency is to consider the Service Design process as similar to the design thinking process that broadly includes the following phases - to define problems; to generate ideas; and to make prototypes, and test them - in an iterative way with the required tools and methods used in the design process (Akasaka, Ohno, & Yasuoka, 2017). Considering that the goal of Service Design is to follow holistic thinking, Service Design may need a different design process, tools and techniques in conceiving new services. Many companies find it challenging to convert ideas into commercial services (Akasaka, Ohno, & Yasuoka, 2017). Hence constant check with business intent is required, and this demands that one capture the business intent at each stage of the Service Design process.



In the current times, although often faced with criticism for lacking integration with business and compatibility with market reality (Brautigam, 2018), Design Thinking has emerged as a reliable driver of user-centric business development. Design Thinking, being an integral part of Service Design discipline, attempts to bring the core focus of any innovation from business to its users. It provides a holistic view to problem-solving, leverages trans-disciplinary collaborations, and encompasses

empathy for the existing social fabric, environment, business, human touchpoints and most importantly the user, who is the prime receiver of any design solution. It is well established now that Service Design, through its comparatively longer engagement with its users, has a definite and active role to play in influencing user behaviour through its product-service systems.

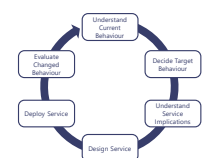
Service Design for Behavioural Change aims at refocusing the intent of any design intervention to the users' actual needs (stated or latent), facilitating a phase-wise transition to an improved behaviour through planned design interventions, irrespective of its medium. To understand the needs and desires of the involved stakeholders, being empathetic to stakeholders is one of the prime tools that the design community depends upon to generate meaningful insights. The primary stakeholders are human beings, who have their own, human values, i.e. beliefs. Hence, it is critical to understand the role of human values in Service Design.

2.5 Reflecting Human Values in Service Design

Services produce value for customers along their journey with the service. A key contributor to the value of service is the experience of interpersonal interactions. Designing services that result in desirable experience and motivate customers to sustain customer loyalty is challenging. The human-centred approach towards Service Design captures the profound insights of customer expectations. However, human values, i.e. beliefs, exist at a deeper and more subconscious level in a customer as a human, than expectations as a service consumer. Hence, there is a need to understand and realise human values that include empowerment, motivation, and awareness of the customers to reflect precisely on what customers want from the service.

The Values Theory (Schwartz, 2007), defines human values as '*desirable, trans-situational goals, varying in importance that serves as guiding principles in people's lives*'. Most often, these values are not mentioned explicitly, but they drive our behaviour both as individuals and as a society. In the human-computer interactions field, researchers have talked about the need to make human values central to the interaction design (Mahamuni, Kalyani, & Yadav, 2015). Naisbitt (1982) said, "*One must learn to balance the material wonders of technology with the spiritual demands of our human nature*". It brings out the need to understand customer values and realise these human values in the process of Service Design and have them reflected in the Service Design specifications.

The next section elaborates the use of Service Design patterns as effective enablers incorporating human values in Service Design solutions through the findings of two case studies. The details are available in the research paper, (Reflecting Human Values in Service Design, 2017) (Appendix No - 1).



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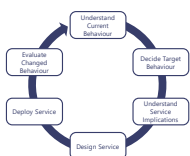
A design pattern provides a solution to a recurring problem and is a structured way of documenting the underlying principles in good design practices and providing actionable design guidance (Athavankar, et al., 2014) (Alexander, Ishikawa, & Silverstein, 1977). While an individual pattern solves a problem, a system comprising a network of them, i.e. a language, helps in solving complex design problems. Use of patterns and pattern language in a range of disciplines, including architecture, interaction design, usability engineering, and computer-supported collaborative work (CSCW) and software engineering has been attempted for a long while. It has led to the generation of many solution ideas to handle a recurring problem right from the early stages of designing. Moreover, patterns and pattern languages are based on user-centric thinking.

For this research, the creative usage of Service Design patterns to help map relevant customer values to create value-centric services for customers seems appropriate. The paper (Mahamuni, Sharma, Khambete, & Mokashi-Punekar, 2017), includes two case studies that validate this approach towards human value-centric Service Design for better customer experience. The paper mentions the following observations, which are useful in the context of Service Design for sustained behaviour change.

1. Human values are generally not mentioned explicitly by anyone. Extracting out the human values through various user research techniques helps to concretise what needs to be focused upon during the whole process of Service Design, in order to enhance the customer experience.
2. The usage of pattern language helps in driving the thought process of designers in a direction and in a more structured way.
3. It demonstrated the usefulness and effectiveness of Cards in the Service Design process.

These observations are essential to establish the role of human values in Service Design and that a structured approach helps to uncover them. The advantages of specific attention to the customer human values for Service Design was underscored on several counts (for example, contribution to the enrichment of the design, continuous empathy). When the discussion is about human values and behaviour change, it leads to the role of ethics. The next section deliberates upon this.

2.6 Design for Behaviour Change and Ethics



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It is widely understood that design naturally has an impact on human behaviour, which is dependent on many variables, such as context and motivation. There is also a general admission that designers need to take responsibility for designed user actions (Niedderer, 2014). Human behaviour change and ethics are generally discussed together. Ethics affect people's decision making about what is right for

individuals and society and is also described as a system of moral principles or philosophy. It is derived from the Greek word ‘ethos’, which can mean custom, habit, character or disposition (Ethics: a general introduction, 2014).

“Ethics is based on well-founded standards of right and wrong that prescribe what humans ought to do, usually in terms of rights, obligations, benefits to society, fairness, or specific virtues.”

Manuel Velasquez and others (2014)

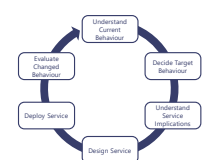
Being ethical is abstracted as behaviour about autonomy, dignity, and avoiding manipulation. Design interventions should not, and need not, compromise either dignity or self-governance. Transparency and public scrutiny are essential safeguards (Sunstein, 2015). Behaviour change varies from micro in nature, such as influencing buying behaviour, to large-scale social changes like lifestyle changes. It is evident that usually, there are many stakeholders involved in any situation, and therefore, the question arises as to whose preferences are to be addressed for design intervention (Niedderer, 2014).

Service Designers play a very crucial role in ensuring the way ethical concerns are taken care of during Service Design for behaviour change. The role of ethics is further explored later in section 5.2.1.

2.7 Role of Service Designer

Design of evolving services is a customer-centric activity of planning and organising people, infrastructure and communication as a holistic socio-technical system (Fensel, Facca, Simperl, & Toma, 2011). A Service Designer must consider the needs of the entire world, including the environment (Design Council, n.d.). Like product design, Service Design is a creative problem-solving activity, which involves thinking with the body and externalisation of thinking through in-process artefacts. Unlike product design, Service Design incorporates temporal relationships making it complicated. Services are multidimensional as they involve socio-technical and user-centric aspects. Hence, people from various domains need to contribute to Service Design.

The origin of Service Design is found in the service marketing field (Shostack, 1982) (Stostack, 1984) (Scheuing & Johnson, 1989). The initial focus of Service Design research was in developing a suitable and appropriate approach for improving the quality of the service delivery process. Research on service science (Maglio & Spohrer, 2008) and service engineering (Bullinger, Fahrnich, & Meiren, 2003) (Arai & Shimomura, 2004) have emerged as a scientific and engineering approach that can analyse, design, and evaluate services. Considering these developments, Vargo & Lusch (2004), argue that all markets are centred on the exchange of services, and the new paradigm for marketing.

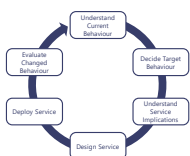


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While dealing with increasingly complex issues, product designers have expanded the scope of their activities beyond the design of objects that typically focused on the ‘traditional’ boundaries of form, function, material and production (Miettinen, 2011). They have now moved into the realm of interactions, systems and environments. Consequently, product designers have now departed from paying attention to the material existence of products and now also focus on activities, services, and policies (Buchanan, 2001). This expansion in the activity and scope of product designers, framed by the economic and industrial shift from G-DL to S-DL, has enabled them to move into the design of services. Additionally, specific product design perspectives such as “*a user-centred design approach, a variety of qualitative and quantitative research and data gathering approaches, and visualisation techniques such as sketching, imagining and prototyping*” (Miettinen, 2011) has allowed product designers to champion the development of Service Design as a new design discipline.

Service Design helps service providers to devise a strategic positioning for their service offerings. It aims at applying design principles and methods to create services that are useful, usable and desirable to the customers. Service Design emphasises the internal state of the users’ mind during service use through designing customer-centred services. These require a deep understanding of customers’ life contexts, goals, expectations and human values that they cherish. Human values are beliefs or ideas about what is desirable in a context and situation. These are the fundamental virtues which make us human and play a significant role in guiding all our actions, judgment and decisions (Harper, Rogers, Sellen, Human, & others, 2008). It is therefore reasonable that, human values which lie very close to the heart of people, have a significant impact on their expectations from a service in a given context. Hence, there lies a need to consider human values of customers while designing services for better customer experience. A Service Design approach focusing on identifying the users’ values in the early stage of the overall design process, helps design services to fulfil the users’ values (Akasaka, Ohno, & Yasuoka, 2017). Service providers use a variety of ways, such as process design, culture building and training through which they ensure adherence to human values. However, it would be beneficial if the design of their service touchpoints and service encounters embed human values.

Recently, companies have started understanding the importance of creating a seamless service experience. Service experience is universal, and it reflects the company’s brand value all the time. Whether the customer is at home or in a store does not matter. Service Designers need to make such experience happen continually. Hanttu suggests the following activities that characterise the Service Designer’s role while designing services (Hanttu, 2015):



1. Enjoy problem solving by not minding fuzziness and vague design briefs. Get clarity by asking questions and enjoy solving complex problems.

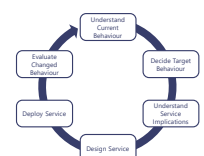
2. While designing for the service user, remember to understand other stakeholders and processes around the service user. Understand the big picture in connection with the specific case.
3. Be a people person by socialising with all types of people and try to read people and ask relevant questions without influencing the other person.
4. Be cognizant of the impact on society, environment and overall wellbeing of all human touchpoints.
5. Tirelessly thrive for creating better experiences for all involved stakeholders.
6. Be proud of doing something that benefits the service user and in turn, gives self-satisfaction.

From the designer's perspective, the Product to Service transition may be a result of their design approach. The ability to map product design skills to Service Design challenges helps to make a shift from product to services. Along with that, advancements in new professional design areas have accelerated this shift. As a Service Designer, most of the time, one needs to work in a multidisciplinary team, where collaboration with others is a crucial aspect.

2.8 Distributed Cognition as a Conceptual Framework for Service Design in a Collaborative Setting

Service Design is the natural extension of the design activity where multidisciplinary collaboration extends over a period. Hutchins developed a theory of distributed cognition (DC), which redefined 'information' as the propagation of representational states of mediating structures of any complex system. This section explains the use of distributed cognition concepts in the Service Design process for multidisciplinary team collaboration. It recognises the influence of non-human agents on service through a case study. While working in a team on the same artefacts, the artefacts played a role in supporting each other's thought process through a mental structure of problems and solutions. It has implications on the design process and the artefacts generated.

In the section that follows, snippets from the researcher's paper (Exploring Distributed Cognition as a Conceptual Framework for Service Design, 2017) are reproduced wherever required. The complete paper is presented in the Appendix section for reference (Appendix No - 3).



Overview

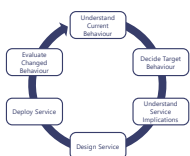
2.8.1 Background and Related Work

Like product design, Service Design is a creative problem-solving activity, which involves thinking with one's body and externalisation of thinking through in-process artefacts. Unlike product design, Service Design incorporates temporal relationships making it complicated. Services are multidimensional as they involve socio-technical and user-centric aspects. Hence, people from various domains need to contribute to Service Design. The quality of the outcomes of the Service Design process can be accomplished only through multidisciplinary participation and effective collaboration (Mamykina, Candy, & Edmonds, 2002). Multidisciplinary participation also helps to gain deep insights into customer expectations and to add innovativeness in the service being designed (Kimbell, 2011). In order to improve design thinking, there is a need to involve professionals with diverse experiences from relevant disciplines in the design teams, and to effectively integrate their knowledge in the outcomes.

Service Design involves five foundational principles: user-centeredness, co-creativity, sequencing, evidencing, and holistic perspective (Taura & Nagai, 2009). As part of co-creativity and evidencing, external representations corresponding to mental representations of the designers provide a structure that can serve as a shareable object of thought (Kirsh, 2010).

2.8.2 Distributed Cognition (DC)

Cognition is the mental process of knowing through perception, reasoning, or intuition (Neisser, 1976); and it is distributed in time, location, and across human and non-human agents (Hollan & Kirsh, 2000). DC theory identifies that, as a part of the core principles of the cognition process, human beings establish and coordinate different types of structure in their environment that takes effort to maintain and coordinate between them. Humans use their surroundings to enhance their memory (Hollan & Kirsh, 2000). This theory takes a culturally constituted functional group as the unit of analysis rather than an individual mind and redefined 'information' as the propagation of visible states of mediating structures of any complex system. These structures include internal as well as external knowledge representations in the form of skills, tools, memory and culture (Hutchins, Cognition in the Wild, 1995). Hutchins argues that DC concepts help in comprehending aspects of structured experience and individual learning. DC helps understanding how people think and act through continual interaction between brain, body and contextual situations (Hollan & Kirsh, 2000). These interactions happen mainly through external representations supporting more intricate, holistic and involved 'thinking'. The critical components of the DC theory are the 'cognitive system'; 'communicative pathways', and 'propagation of representational states' (Nilsson, 2010) (Rogers, 1997).



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In contrast, with traditional cognitive science, Hutchins (Rogers, 1997) (Hutchins, 2000) believed that human beings create their cognitive powers in parts by creating environments to exercise those powers. In this process, cultural practices play a crucial role. Clark (1998) advocated active externalism, based on the active role of the environment in driving cognitive processes. In a similar vein, Latour (2005) proposed that objects, which are actors in social processes, assume the role of intermediaries and participants in the action. Along with this, these objects also provide continuity during the participatory design process and have appropriate form and content. The researcher noted the resemblance of these ideas to the role of externalisation in the distributed cognitive processes.

Hutchins (1995) developed a theory of DC, which offered a new perspective towards cognition. Challenging the idea that cognition is confined to an individual’s head, he proposed that it is a group process, and must be viewed as the property of a socio-technical system. Externalisations are assigned a crucial role in this perspective. The complementarity of DC and Service Design, concerning the external representations, was noted (Blomkvist & Segelström, 2014). Techniques used in making external representations for Service Design are related to the cognitive processes. They help in articulating insights, learning, communicating and collaborating. Further, they make intangible aspects of services accessible, storable and sharable (Blomkvist & Segelström, 2014).

Fischer proposed a conceptual framework for design based on DC, but its focus was on people with cognitive disabilities (Fischer, 2003). Figure 3 depicts the interconnection of DC, Design and Service Design. DC helps to realise the ‘evidencing’ principle of Service Design during practice.

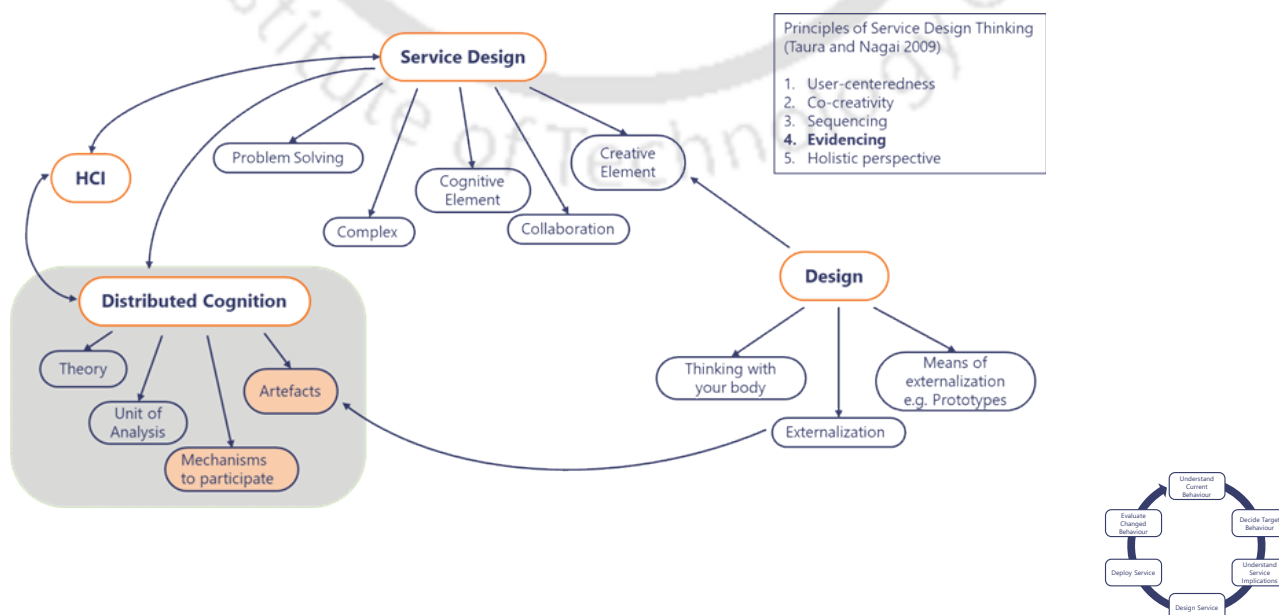


Figure 3: Service Design and Distributed Cognition

2.8.3 Human-Centeredness and Co-Design of Services

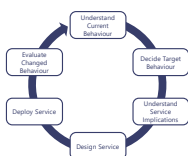
As stated earlier, one of the most desired characteristics of service is being human-centred to achieve customer satisfaction, and in this endeavour, it requires active collaboration within a multidisciplinary team participating in design (Stickdorn, 2000). As co-design involves collaborative decision-making and combining the creativity of multiple people, it helps collectively create several innovative concepts and ideas than while working on their own (Mitchell, Ross, May, Sims, & Parker, 2015). Participants in co-design can be users, designers, professionals and domain experts who together create value for customers. In order to augment the process, a common language or vocabulary should be available to exchange the ideas effectively within the team. Co-design supports the active engagement of the participants in the process of creative conceptualisation, implementation and evaluation (Mamykina, Candy, & Edmonds, 2002) where involved immersive activities are the main drivers for participation (Simonsen & Robertson, 2012).

Enabling the active participation requires active collaboration within a multidisciplinary team and which involves the externalization of knowledge to share among the team and build upon it. The next section explores the design theories related to externalization.

2.8.4 Design Theories and Externalization

Many theories explain the design process, but they mainly focus on creativity, teamwork, management, social aspects, aesthetic or ethical aspects, analytical or visual thinking (Löwgren & Stolterman, 2004), without significant consideration of the role of externalisation. Externalisation facilitates the computation of more explicit encoding of information; enables the construction of complex structure; and helps the coordination of thought. These functions allow people to think more powerfully and creatively with external representations (Taura & Nagai, 2009).

The design process is characterised as a thinking and social activity comprised of the transformation of an abstract to the concrete. It is a transformation from the vision in the designer's head, through an increasingly detailed operative image, to a complete specification and a final product (Löwgren & Stolterman, 2004). It happens through reflection-in-action and reflection-on-action. In order to cope with an intricate design process, a designer needs to externalise the actual design thinking through representations: sketches, drafts, models, and the like. With the external representations, the designer carries out a dialogue about the design situation and solution ideas. There is an ongoing conversation between the designer and the situation and the representations like sketches, drawings, and so on that can be understood as tools for thinking and as mediators in the dialectic relationship between the vision, the operative image, and the situation (Schön, 2017). These



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externalisations help designers to experiment and evaluate their ideas early and cheaply.

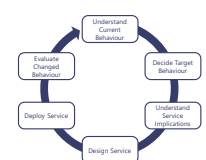
A fundamental construct from design theory is the Conceptual Model, which is a high-level description of how a system is organised and operated (Johnson & Henderson, 2002). A Conceptual Model also called a mental model, is a structure, which exists in people's minds (Brown, 2009). Design patterns are another example of the externalised mental model (Rogers, 1997). People create mental models of themselves, others, the environment, and the things with which they interact. These mental models come into existence through experience, training, and instruction; and serve to achieve an understanding of the world. The designer's mental model as the designer's conception of the look, feel, and operation of a product (Norman, 1988/2002) becomes the shared system image in participatory or co-design. Externalisation helps to evolve this shared system image (Zhang & Norman, 1994). Representing work during system design enables coordination and control of complex, distributed activities. Besides, adopting appropriate representations in the design process could help in bringing together disparate knowledge (Suchman, 1995).

All these theories suggest that there are various externalising structures in the design process. Its importance is well known (Blomkvist & Segelström, 2014). In the same vein, externalisation is explained through the idea of boundary objects. A boundary object is defined as, *"an artefact or a concept with enough structure to support activities within separate social worlds, and enough elasticity to cut across multiple social worlds"* (Star & Griesemer, 1989). Boundary objects bridge the functional knowledge and stakeholder power gaps and can promote shared representation, transform design knowledge, mobilise for action, and legitimise design knowledge (Mark, Lyytinen, & Bergman, 2007).

With the knowledge of externalization, the next section explores how the distributed cognition concepts can be applied during the service design life cycle.

2.8.5 Role of Distributed Cognition in Service Design Life Cycle

As indicated in previous sections, externalisation knowledge is an essential part of the collaboration during Service Design. There is a subtle difference between participation and collaboration from a contribution perspective. Though much research has been done in this field, it seems, building a knowledge base has not been studied from a DC perspective. It seems, DC can be a fruitful framework for understanding how people in a collaborative situation think and act; not because of brain activity alone, but also because of the constant interplay between brains, bodies and situations. External representations play a unique role in this interplay



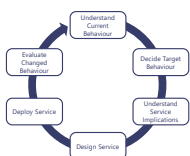
Overview

and allow holistic and complex thinking (Löwgren & Stolterman, 2004).

Considering that Service Design is a collaborative endeavour, the above deliberations suggest that one may draw theoretical concepts based on DC theories, collaboration and multidisciplinary concepts to integrate and formulate an integrated framework for this research. This is explained in section 4.3.1.

The following observations are critical from a Service Design life cycle perspective,

- The Service Design teams iteratively create and work on the same artefacts representing shared cognitive structures.
- These artefacts play a critical role in supporting each other's thought process by transferring and refining a commonly held mental structure of problems and solutions and in turn converting them into shareable artefacts.
- Typically, nature and representation are mapped to the internal structures. For example, in case of personas, the evocative photographs, captions and the '*story of their life*' can be mapped to gain a sophisticated understanding of the behaviour(s) and circumstances; the customer journey map can be mapped to the broad temporal progression and help understand important aspects at each stage such as emotions and thinking.
- Team members develop internal mental structures as part of the various phases as well as due to past experiences and knowledge, which get transferred as personas, scenarios, CJM and solution ideas.
- It is also evident during multiple phases of the Service Design process that the structures continuously change, and new structures are formed through an iterative process leading to one common understanding wherever required.
- These synthesised common understandings are then used during the further design process.
- Multiple in-process artefacts are created along with the final artefacts.



The study provided strong evidence of the instantiation of DC concepts during the Service Design process, which is a long duration, intermittent activity. The Service Design process must recognise the need to deal with several mental models of participants and incorporate elements to externalise it appropriately after synthesis

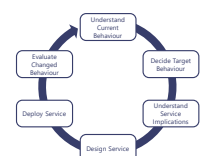
and apply it effectively as the design evolves. The multidisciplinary team exhibits the implicit use of DC concepts during the Service Design process and would need mechanisms to externalise the internal thought process, i.e., mental models, harmonising them and maintaining the continuity across them.

This study has pointed to the likely characteristics such externalisations should have to serve as capable vehicles to support distributed cognition. Iterative development, synthesis of multiple individual mental structures and a form that can be '*intuitively*' comprehended regardless of the domain of expertise (for example, Persona, Scenarios, CJM and Design Patterns) seem to be the attributes. These findings are utilised in this thesis as elaborated in section 4.3.1.

2.9 Chapter Conclusion

In this Chapter, we have discussed the various aspects of design, including problem-solving. There is a multiple systems approach which informs design discipline. While understanding what Service Design is, it is essential to understand the core difference between products and services. This Chapter elaborates on the shift of product, service and experiences. The role of a Service Designer during these shifts and the expectations from them are also discussed. While understanding the design for sustainable behaviour, its impact on the environmental and social issues, and how designers are tackling it, the challenge for designers emerged. The exciting thing is that any design, whether it is for product, service or anything else, affects people's behaviour. Along with behaviour change, there are other effects of designer outputs on society and the environment. These include the positive as well as negative impacts intertwined with environmental sustainability, social wellbeing and financial wellbeing of involved stakeholders.

This Chapter focused on the intersection of behaviour change and Service Design. It also identified the transposable insights applicable in Service Design and mapped them to the standard Service Design methodology. The role of human values and distributed cognition and how they can enrich the Service Design process are explored. At the end, this chapter explores the ethical aspect related to Service Design for behaviour change. This overview set up the basis for exploring the research gap, as explained in the next Chapter.



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3 Research Gap Analysis

This Chapter presents the secondary research as well as the exploratory primary research undertaken in order to get a better understanding of the identified research enquiries (section 1.3.1). The multi-pronged strategy to understand and identify the research gap is based on theory and practice. The study attempts to identify the research gap concurrently through literature, by understanding a practitioner survey (India, Global) and hands-on case study.

The underlying premise is based upon the assumption that design knowledge resides in people, process and products (Cross, 1982). We explored the people and the practice aspect through a case study to uncover the nuances when people are practising design without knowing about it. If the literature survey indicates a gap in knowledge, but practitioners are already doing it and have the required knowledge, then it is not a significant gap to address. However, if the review of existing literature does not show any gap in knowledge, but practitioners are expressing the need, then it is worth considering it. We believe that such an enquiry will clearly give insights that are focused on understanding the gap in knowledge as well as in practice.

The following section first describes the various literature review methodologies examined before arriving at the literature review methodology for this thesis. It also presents the literature review summary as an outcome of the selected methodology.

3.1 Literature Review Methodologies

After a review of multiple websites, blogs and research papers and having undertaken discussions with various experts and doctoral research students, the characteristics of a literature review can be summarised as the following 5 C's:

- Convergent – *“to come together and have one interest, purpose, or goal”* (Merriam-Webster, Incorporated, 1828).
- Contextual – *“it is placed in an appropriate setting”* (Merriam-Webster, Incorporated, 1828).
- Cohesive – *“closely united”* (Merriam-Webster, Incorporated, 1828).

- Comprehensive – “including many, most, or all things” (Merriam-Webster, Incorporated, 1828).
- Complete – “having all necessary parts” (Merriam-Webster, Incorporated, 1828).

As Service Design works closely with technology, the researcher tried to draw the essence of a literature review from prevalent literature review methodologies in computer science and design research. In a tertiary study conducted on literature review methodologies (Kitchenham & Charters, 2007), two noticeable methodologies namely, systematic mapping study (Petersen, Feldt, Mujtaba, & Mattsson, 2008), (Tofan, Galster, Avgeriou, & Schuitema, 2014), and systematic literature review (Brereton, Budgen, Turner, & Khalil, 2007) were identified.

Table 2: The Characteristics of Systematic Mapping Study and Systematic Literature Review

	Systematic Mapping Study	Systematic Literature Review
Goal	Thematic analysis, Publication classification and identification of publication for a purpose	The primary goal is to establish the state of evidence
Research Question	Broad research question	Specific research question
Method	Considers a large number of articles and does not evaluate them in detail.	Considers a lesser number of articles, where the identified articles are evaluated with high rigour.
Style	Covers breadth	Covers depth

Table 2 describes the comparative characteristics of systematic literature review and the systematic mapping study. Looking at the ‘Scope of Research Enquiry’, following characteristics represent this thesis exploration

- The problem statement is broad [Similar to Systematic Mapping Study]
- Availability of a relatively smaller number of publications on this topic [Similar to Systematic Literature Review]
- Existing publications are not classified using any systematic study [Similar to Systematic Mapping Study]



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TH-2292_156105006 • Exploration starts with a broader research question but ends with specific

exploration [Combination of Systematic Mapping Study and Systematic Literature Review]

3.1.1.1 Proposed Literature Review Approach

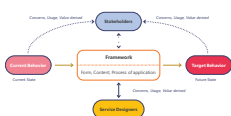
Drawing from the above comparative table, this research has used an extended Systematic Mapping Study that starts with the broad research enquiries mentioned in 1.3.1. After deciding the keywords, a review was conducted, and the findings reported as a Systematic Literature Review. The process steps are then iterated to explore the research enquiries mentioned in 1.3.1. In every iteration, an extended set of publications were used, and keywords modified, as required. The intermediate review report triggered new iterations.

Considering the broad-based spectrum of knowledge domains that need to be considered for this research, contextual literature review, i.e. doing it wherever relevant, was undertaken wherever required and in a given context (along the stages of the research journey). For example, a contextual literature review of various forms for the toolkit was undertaken when the toolkit was being developed. Accordingly, the literature review is reported under the different Chapters during various stages of the research journey. In retrospect, this helped the researcher to stay contextually aware and be focused during the literature review.

3.1.2 Literature Review Summary

Within design research, behavioural change studies are not yet universal; most of these studies have come from sociology, psychology and allied fields.

The contextual literature review of research enquiries mentioned in section 1.3.1., has helped to unearth the need and the significant research gap in the domain of Service Design and behavioural change. Of significance has been the need for interdisciplinary knowledge transfer that looks at the development of a Service Design application that focuses on behavioural change. It primarily points towards a need by the design community for guidance, or a toolkit, to bring together behaviour change knowledge in a form which is of use to designers. Currently, the tools available are mainly for the idea generation phase of the design processes. However, the opportunity to provide active guidance throughout the Service Design process based on the conceptual model remain unexplored as very little research has been pursued in this domain.



Research in the field of ‘*design for sustained behaviour*’ is focused on exploring the field of possible interventions and the ways designers can apply behaviour change-related ideas. Boks (2012) notes, “[o]ne of the key understandings needed to develop and successfully apply design for sustainable behaviour strategies have been found

to be a certain categorisation of mechanisms that can be used to influence user behaviour”.

As part of the different aspects of behavioural change, a literature review of the following aspects has been undertaken for this research:

- What are the influencers of behavioural change?
- What triggers behavioural change?
- How should behaviour be understood?
- How should the spectrum of control be decided?
- What is an acceptable level of intrusiveness?
- What is the effect on/of the context and cognition?

Various categorisation approaches and design processes considering these aspects have also been explored. Service Design and Design for Behaviour Change are relatively new and evolving disciplines. Behavioural theories have been resurrected in recent years by economists looking for ways to explain numerous biases in economic choices (Kahneman, 2003) (Mullainathan & Thaler, 2000). The focus during policy making has been on the design of artefacts, communication and processes to ‘nudge’ citizens in an ethical way to either exploit or counteract those biases that ensure socially desirable behaviours. For example, the Behavioural Insight Team in the UK was mandated by the Cabinet Office to find solutions to encourage citizens to pay taxes on time. The overall objective was to improve public services with scalable and low-cost solutions. Due to its success, many other countries also set up a similar team. A crucial question emerging in policymaking is ‘how to encourage and sustain more permanent transformations in behaviour’. For example, how to ensure not only that a citizen pays his taxes on time once, but also adopts a systematic approach to interact with fiscal authorities. It is particularly relevant for the long-term transformations envisaged by social initiatives such as Resilient Cities. Citizens may, for instance, radically and permanently change their patterns of mobility. The various stages of behaviour change were investigated in some theories, such as the Stages of Change model (SoC) also known as the Transtheoretical Model (TTM) (Prochaska & Velicer, 1997), the Precaution Adoption Process (PAP) (Weinstein, 1988) and the behaviour wizard (Fogg & Hreha, 2010). All these are not from a designer’s perspective and not an easy form to grasp for a non-expert.

The well-trodden methods of user-centric design have not ensured the sustained impact that was expected and may need further investigation (Gasson, 1999). Often,



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the current mental or behaviour stage of the user is considered while designing, but the fact that design will change the user's stage is not taken into account. The stages of behaviour change, as indicated by TTM or PAP models, may help to map user progression. Designers are not, however, using behavioural theories as much as they could, due to the lack of actionable guidance (Niedderer, 2014). Currently, the integration of behavioural theories and design is patchy and depends on a single person or unit. The quality and impact depend upon the individual's knowledge about behaviour change principles and frameworks.

The overview of Service Design and behaviour change discussed in Chapter 2 reviewed behaviour change concepts and principles which could enable Service Designers to influence behaviour through Service Design. There are many behaviour change principles, models and theories which are useful for analysing and classifying existing behaviours. However, those are not primarily in a form intended to be used for designing interventions. They are not envisaged as creative tools, nor do they encourage divergent thinking, which is an essential part of the design process (Getzels, 1987). Although designers are usually experts on aspects of behavioural change, the Designers' work, whether it comprises a product or service, inevitably influences human behaviour. However, when designing to induce behaviour change, it is desirable that designers need to understand the applicability of behaviour change principles and the framework drawn from behaviour science literature.

“Transferring theory from disciplines such as science and technology studies, computer studies or sociology into design appears to be a relatively new research agenda for designers” (Lilley, 2007) and toolkits like ‘Design with Intent toolkit’ (Lockton, 2013) and ‘Designing for behaviour change toolkit’ (Bridgeable, 2017) have been developed demonstrating the value of horizontal knowledge transfer between the two disciplines. These toolkits tried to address the lack of practical applicability in a design process for behaviour change. However, these toolkits mainly focused on ideation part of the design life cycle. There is no toolkit or framework available which holistically integrates the inputs from behaviour sciences into the Service Design life cycle. To understand the design practitioner's views on what they do when briefed with influencing behaviour, Indian design practitioners were surveyed as part of this research, as explained in the following section. The next chapter also includes a survey of global Service Design practitioners to understand the adequacy of the current methods, tools and techniques while addressing behaviour change through Service Design.

As one is aware, Service Design's role in the area of behaviour change is growing day by day. However, there are very few resources available to assist Service Designers working on behaviour problems. In literature, there is not much design-focused guidance for Service Designers who have received design briefs with behaviour change intentions. There are multiple approaches present such as providing an inspiration guide, enabling cross-domain mapping (Zbikowski, 1997), and bringing



together examples, insights and relevant knowledge from different disciplines relevant to influencing behaviour. In the design thinking process, the source of inspiration, the trigger for ideas and understanding context play a crucial role (Eckert & Stacey, 2000). During ideation, insights from behaviour change principles in the form of sets of examples, guidelines or, other forms may help in workshops or different settings. Hence, there are opportunities for Service Design process guidance regarding behaviour change.

There is a need for extending inter-disciplinary knowledge transfer in design for behaviour change (Lilley, 2007). This need is more evident due to the holistic nature of Service Design, in which inter-disciplinary knowledge transfer may be required throughout the Service Design life cycle. The results of the Indian practitioners' survey (section - 3.3) and global Service Designers' survey (section - 3.4) support this argument overwhelmingly. Hence, opportunities were identified for actionable guidance which brings together behaviour change knowledge in a form which is easy to use for Service Designers during the Service Design life cycle.

Behavioural economics can be considered as a scientific lens on decision making, which believes that humans make decisions based on cognitive shortcuts, also known as heuristics that time and again result in '*irrational*' decisions. These heuristics are highly sensitive to the framing of choices, and hence people's decisions can be influenced by '*nudge*'. This research mostly happens in academic settings, but there is an increasing trend to leverage it in consumer contexts (Thaler & Sunstein, 2008).

Behavioural economics has been at the forefront of proving behaviour change theories and principles. The power of behavioural economics lies in identifying the decision points that are vital from nudging users' outcomes towards more significant impact. Behavioural economics does not mean to apply behaviour change theories and principles holistically to shape the service experience. Nevertheless, designers can identify and tweak critical decision making moments for greater success. Behavioural change principles, including those drawn from Behavioural economics, can act as a supplement to the design process. These should not be aimed as a replacement for design thinking or similar means. Behavioural economics seeks to understand people's decision making through multiple lenses like psychological, behavioural, emotional, and social factors. Behavioural economics advocates that people are irrational. Therefore, Designers cannot just rely on merely providing information with the expectation that people will act accordingly.

Generally, people behave in '*predictably irrational*' ways, and there are recognisable patterns that govern behaviour under certain circumstances (Ariely, 2008). Behavioural economists have compiled a vast number of '*Behavioural Economics Principles*' describing them at a high level representing most people's behaviour in specific situations. These principles can help designers understand current behaviour and can help to influence behaviour by leveraging relevant Behavioural



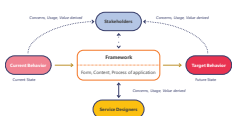
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principles at decision-making moments. The critical aspects of Behavioural economics are to understand and strategically intervene at crucial decision-making moments which may nudge people towards the desired behaviour. This '*nudging*' at such discrete moments can have a broader cumulative impact if applied in the right spirit throughout the user journey. (Bridgeable, 2017).

Service Design is a holistic and generative approach to insight formation until intervention design. Service Design exists primarily in a business and commercial context, where insights are developed through a combination of primary and secondary research, synthesis, prototyping, testing, and iteration. Service Design tends to interpret human behaviour as a holistic expression of broader social, economic, and cultural contexts and takes a holistic approach to influence and facilitate people's behaviour by creating a wide variety of outputs like choreographed experiences, relevant policies and processes, and service touchpoints (human and technology). Service Design user research aims to develop insights about user behaviour and service needs in a given context. It is mainly relying on in-process artefacts such as, customer journey maps or personas to distil highly complex qualitative data into synthesised, actionable insights. Insights may refine or become concrete as the Service Design process progresses through the act of ideation, prototyping, testing. The iterative nature of enquiry may generate new insights at every stage. There are many available approaches for conducting user research and the tools for synthesis. Hence Service Designers need to determine the best methods for the given design brief for the context.

Service Designers focus on going wide on the whole service experience while behavioural scientists focus on going deep to improve a single decision. Hence, they have different specialities to serve different purposes. However, for designing services for behaviour change, there is a need to find out ways to combine these specialities. As a Service Designer, the emphasis remains on shaping the moments of interactions of users with technology as well as human touchpoints. Most of the research addressing behaviour change has focused on short-term changes. However, there are several problems which demand a long term behaviour change, i.e. sustained behaviour change.

As discussed in section 5.1 (Foundation of Knowledge Framework), different theoretical models emphasise behaviour change as the consequence of a slow process of cognitive shifts. Besides, current research tends to utilise methods that focus only on short term change and highlight factors defined by pre-existing context rather than the person. It seems much remains to be learnt about why people change their behaviour and how this change can be sustained. As per literature, behaviour change is the result of a series of action plans and the endpoint of a gradual shift in cognitions (Prochaska & DiClemente, 1983). Also, the goal of behaviour change interventions is to facilitate the realisation of such plans and to change cognitions to encourage change (Gollwitzer & Sheeran, 2006).



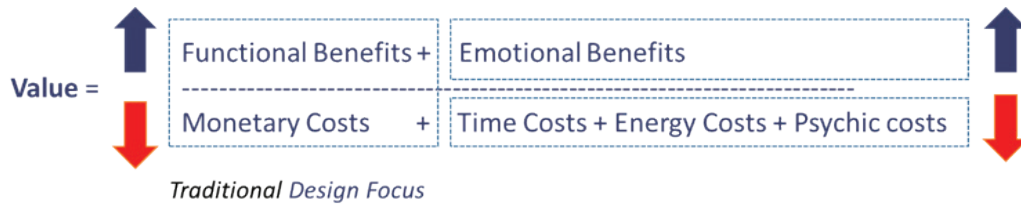


Figure 4: Customer Value Formula (Kotler, 2000)

As part of literature drawn from Management studies, the value equation by Philip Kotler (Marketing Management (The Millennium Edition), 2000) captures customer value holistically. As shown in Figure 4, customer value does not get influenced only by functional benefits and monetary costs. It also gets affected by the associated emotional benefits, the required time, the energy spent and the stress. It is imperative to provide the expected value to the customer. All these factors need to be considered while designing interventions.

Table 3 shows a comparative summary of Service Design and design for behaviour change with regard to various aspects such as human centricity, locus of value creation, temporality, co-creation of value, stakeholders, key contributing disciplines and the role of technology. The 'Elaboration' column provides a brief comment on the difference between Service Design and design for behaviour change. (Mahamuni, Khambete, & Mokashi-Punekar, 2018).

After understanding the relevant behavioural models and types of interventions, it seems evident that many behaviour-influencing aspects need to be considered while designing services concerning behaviour change such as motivation and triggers as shown in Figure 5.

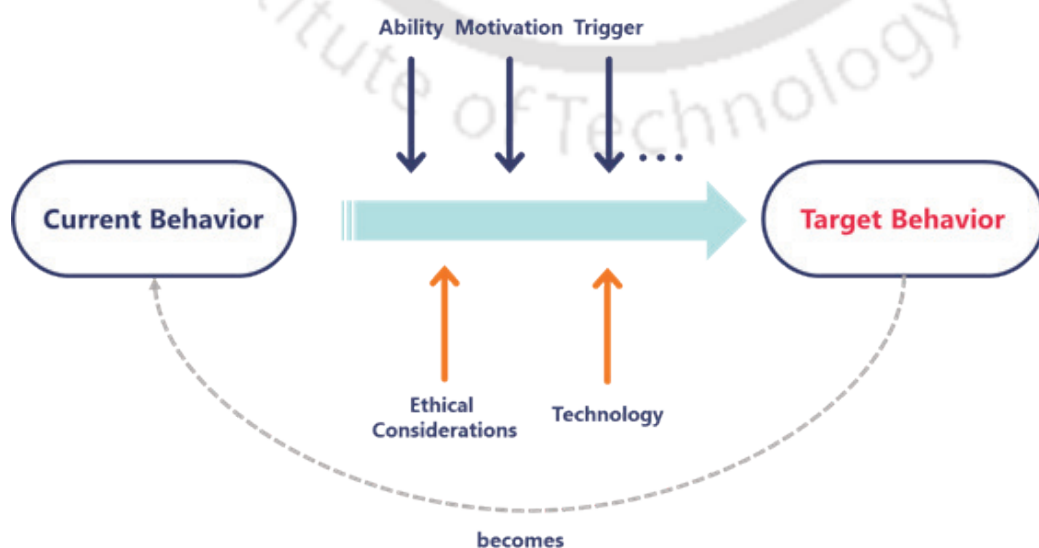


Figure 5: Journey Of Current Behaviour To The Target Behaviour



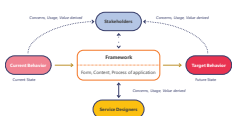
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Table 3: Research gap concerning Service Design and design for behaviour change (Mahamuni, Khambete, & Mokashi-Punekar, 2018)

Aspects	Service Design	Design for Behaviour Change	Elaboration
Human Centricity	Individual user, emergent concerns of individuals, groups and society	Individual, groups, and society	The individual is the primary fulcrum, embedded in the social fabric.
Locus of Value Creation	Commercial settings as well as for individual wellbeing and societal objectives	Mainly individual and societal wellbeing objectives. Also used in commercial settings	Increasingly social ventures are service organisations that work towards behaviour changes
Temporality	Short (Service Encounter) to long (Relationship)	Short (one-time change in behaviour) to long (sustained behaviour change)	Both consider engagement over an extended time for maximising the value
Co-creation of Value	User and service provider have mutually agreed on roles	Agency of change rests with the user, facilitated by other stakeholders	Co-creation of value critical for maximising the benefits
Stakeholders	Primary: Service User, Service Provider. Allied: Community, partner firms	Primary: Individual Allied: Change facilitators (government, organisations, community)	Harmonising the activities of the stakeholders towards the individual's goals is critical
Key contributing disciplines	Multidisciplinary	Multidisciplinary	Disciplines play a role depending on the needs
Role of Technology	Enabler	Enabler	Technology is increasingly an essential component

Over the years, numerous theories, models and frameworks have been developed, helping to demystify the complexity of behaviour understanding and prediction. Most of the models provide the classification of the behaviour or interventions. As Bowker and Star (2000) note, every method of categorising things inevitably prioritises some perspectives over others. From a practical perspective, the essential consideration is whether classifications offer perspectives which are of use for evolving understanding or signifying possibilities. Most of these models and frameworks can be categorised as follows:

- approaches to understanding individual behaviour and context;
- determining types of behaviour;
- the process of behaviour change;
- theories about the steps that individuals take before taking actions.



It is observed that multiple theories and models which are based on a single case study and that are very specific to a given problem, lack sufficient generality (Michie, 2014).

Interestingly, after a specific time frame, the target behaviour becomes the current behaviour and the cycle repeats, as shown in Figure 5. It is essential to understand and consider it while designing services with a holistic view by avoiding ‘Local Maxima and Global Minima’ of customer value.

Lilley (2007) addresses both environmental impacts and social impacts. Defining ‘negative social impact of use’ as:

“Any action enacted or facilitated by the product or resulting from the behaviour of the user in the use of the product which diminishes the health, wellbeing, social equity or quality of life of others affected by the use of the product.”

It is an important aspect which needs to be considered. A service designer needs to take care of the design for minimising the negative social impact of others on one’s behaviour.

All these behaviour change influencers such as ‘motivation’, ‘ability’ need to map to the service characteristics. Subsequently, the various design aspects of creating a Service Design framework for sustained behaviour change, as shown in Figure 6, need to be considered.

It is evident from the literature that the behaviour change influencing mechanism goes through the cycle, as mentioned in Figure 7. Understanding the current behaviour and determining the target behaviour for a given purpose are very crucial before designing any intervention.

To conclude, previous research has either focused on individual behaviours, or

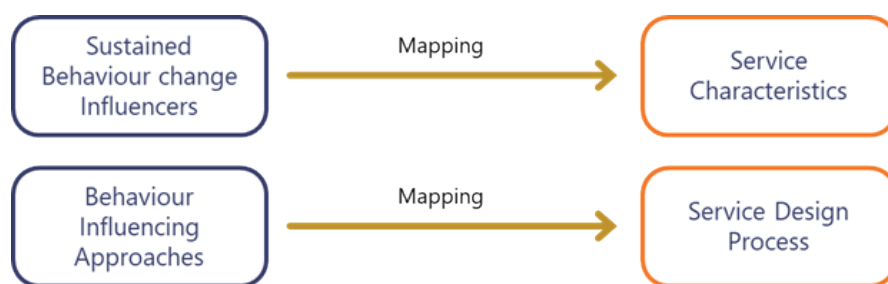


Figure 6: Mapping Of Behaviour Aspects To Service And Service Design



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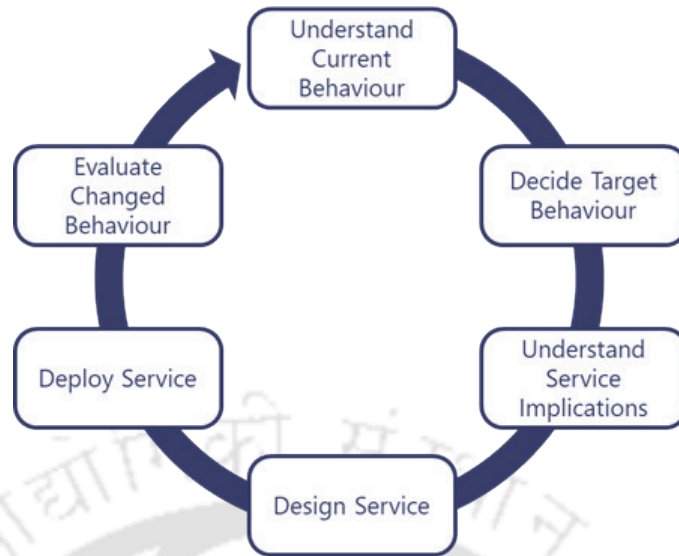


Figure 7: Service Design Life Cycle For Behaviour Change

behaviour change in the short term and has tended to emphasise the development of plans and a gradual shift in cognition. There are indications that sustained behaviour change may involve a different set of mechanisms. There is a need for a set of sustaining conditions to facilitate a behaviour change. Service Design looks holistically at the entire customer experience where behaviour economics focusses on one specific decision and a pivotal moment in time. The further contextual literature review summary of various behaviour change models, frameworks and toolkits are elaborated in Chapter 5.

3.2 Designing Organizational Services – A Case Study

People design things. People who are not conventionally called designers also design things or design systems (Kimbell, 2011) (Kimbell, 2012). Generally, these people are doing it based on their tacit knowledge.

Happy employees make happy customers. In the pursuit of making happy customers, most of the time, one may lose sight of the concerns of one’s employees. In the long run, ignoring the needs of one’s employees leads to ruining the customer experience, brand image and organisational culture. Most organisations have realised the importance of addressing employee concerns and started focusing on addressing their concerns to proliferate a design-led innovation culture. In this endeavour, organisations have started designing employee services, considering them the customers of the internal services. However, designing services for organisations of today present several challenges, complexities, as well as opportunities with the transforming organisational landscape. This case study demonstrates how



the current Service Design tools and methods are adopted during the process. Currently, it focuses on employee hiring and integration-related organisational services. (Mahamuni, Sharma, Lobo, Hirom, & Khambete, 2018).

This case study is based on the hypothesis that when new people join the organisation, they undergo a behaviour change to adapt to the new organisational culture. There are elements of behaviour change which are implicit in this.

In this case study, the current organisation employees who are tasked with onboarding new employees into the organisation were studied. How do they design, what do they design? Does this imply that they somehow apply the design and behaviour change principles in planning their tasks for onboarding new employees?

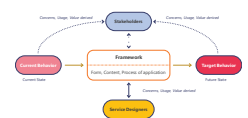
Making explicit the tacit knowledge that these organisation employees possess will be beneficial to all the designers (Nonaka, Takeuchi, & Umemoto, 1996). Giving explicit knowledge through the framework will be beneficial.

Drawing from this case study may help in developing a framework that will help in making this knowledge explicit and beneficial for Service Designers.

3.2.1 Case Study - Introduction

With the rapid transformation of organisations towards advanced digitalisation and integration of processes with smart technological systems, service organisations today have complex systems spread across physical and digital spaces involving several stakeholders and engaging a wide range of collaborations across disciplines, geographies and cultures. With the large multi-cultural diversity that they engage in and deliver services to, it is imperative for these organisations to increasingly adopt and proliferate Service Design-led innovation culture across their organisation and promote service differentiation and customer loyalty through experience-centric services (Zomerdijs & Voss, 2010). Enabling a broad and holistic understanding of service-related challenges, Service Design plays a crucial role to innovate services and facilitate gaining of competitive advantage through value co-creation and management of service experiences. With cultures and design practices at the centre of the digital revolution (Celaschi, 2017), service organisations have immense need and opportunities to enable Service Design in organisational services to efficiently design and implement customer experiences, effectively engage and collaborate with stakeholders, and analyse service delivery systems with ease.

Intending to improve the overall employee experience in the organisation, this researcher, who is an employee of this organisation, collaborated with various administrative and human resources (HR) departments across various locations in India. The objective was to undertake Service Design research and design of



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organisational services catering to the different phases of an employee's journey in the organisation. Leveraging trans-disciplinary collaborations for an ecosystem-based holistic design, the different projects in the research journey focused on multiple stakeholders to design sustainable experience-centric services for employees.

This case study highlights the Service Design approach towards the design of organisational services in a large IT organisation. This study further presents the relevance of frameworks, tools and methods to improve overall employee satisfaction. The case study also highlights the challenges and opportunities for Service Design to facilitate a design-led innovation culture in the organisation.

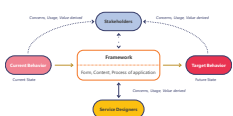
3.2.2 Case Study Background

3.2.2.1 Employee experience design as a conduit to a customer-centric culture

With advancing technology, e-commerce, personalisation and highly engaging consumer services, consumers expect services with excellent customer experience. Several design researchers concur on the definition that *“an experience occurs when a customer has any sensation or knowledge acquisition resulting from some level of interaction with different elements of a context created by a service provider.”* (Pullman & Gross, 2004, p. 553). McLellan states, *“the goal of experience design is to orchestrate experiences that are functional, purposeful, engaging, compelling, and memorable”* (McLellan, 2000, p. 59).

There is ample evidence to draw correlations between positive employee attitude, customer satisfaction, perceived service quality and an organisation's business performance (Chi & Gursoy, 2009; Yee et al., 2008). Satisfied employees can significantly enhance employee retention, innovation and customer experience (Wagner, 2017). Experience centric organisational services act as facilitators to higher levels of employee engagement (Saks, 2006) and improve employee commitment and retention by creating a fertile ecosystem to support employees' aspirations, learning, personal well-being, and career growth. This appreciates the need to focus on employee services catering to the end-to-end journey of the employee in the organisation and providing a seamless experience across all service delivery systems.

3.2.3 Case Study Approach



The company under consideration is a large multi-national IT services organisation, which is itself going through a transition, aiming at adopting state-of-art technology towards customer-centricity, mass customisation of experience, and creation of exponential value. Most IT organisations are along the same journey. They can

vastly benefit from Service Design and design thinking, especially to bring about the shift and benefits to their clients and their services. However, despite Service Design being a powerful enabler, it often faces roadblocks in adoption (Katz, 2015; Salibian & Pratt, 2018).

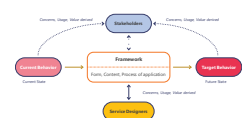
To better understand the challenges to Service Design within their organisation and to adapt proposed methodologies, this research team undertook a series of projects for addressing employee concerns. Throughout the internal projects, this research team utilised the Research through Design (RtD) (Stappers & Giaccardi, 2017) methodology, which advocates a plan-act-reflect-refine cycle, following which the research team continually refined their processes and methods. This research team had focused on team discussions and review of artefacts and notes made during the design journey, to document their experiences.

3.2.4 Insights

It was evident during the case study that people indeed design things within their capacity. People who are not conventionally called designers, but in this case, HR and Talent Acquisition Group (TAG) members were designing services for the newly joined employees. The team had acquired tacit knowledge over time, and it was evident when they were thinking about the solution. During a discussion with them, the need for a formal framework which can make things explicit came out very strongly. The need for a knowledge repository in an accessible form regarding the behaviour change principles came out to avoid person-dependency. Currently, this required knowledge resides with a few people, and hence the solution quality varies depending upon the people involved.

3.3 Indian Design Practitioner Survey

We investigated the current picture of appreciation, state of relevant knowledge and skills, and practice among the Indian design professionals regarding Service Design and design for behaviour change. Among other things, the current scenario regarding embeddedness and the maturity path of Service Design in academic institutes and industry were studied. Indian society and businesses are facing challenges that are wicked, deep and complex due to the diversity of social, cultural and economic conditions. Such institutions could benefit from a synthesis of Service Design and design for behavioural change. This study was exploratory in nature; however, it is a significant initial step to emphasise the need for, and gaps in aspects of effective Service Design for behavioural change practice in India and suggests indicative interventions. With these interventions, Indian professionals could achieve maturity and be in a position to address the wicked problem India faces. This section is premised upon relevant snippets from this researcher's published paper (Service design for behavioural change-current state of the discipline and practice



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in India, 2018). This full paper is available in the Appendix section (Appendix No - 4).

3.3.1 The objective of the Survey

India Design Report (2015) declared the demand for services and Service Design in India. However, only a handful of instances of empirical research is available regarding the extent to which design professionals in India perceive the relevance and practice of Service Design. The objective was to carry out an exploratory study to obtain the current picture of appreciation, state of relevant knowledge and skills, and practice among the design professionals regarding Service Design and design for behaviour change. Being an exploratory study, a corollary aim was to identify directions for future research. It was also hoped that some indicative measures based on the findings could be suggested.

3.3.2 Methodology

This research was based on a mix of qualitative and quantitative data. A survey questionnaire was developed and administered among Indian designers. Some of the critical details sought were: a view on Service Design and Service Design practice oriented towards behavioural change, the nature of the organisation where they work, and their current role. In order to understand the various dimensions of the current state of the service-design practice in India and design for behaviour change, aspects such as customer demand, the design process, the influence of organisational contexts and the outcomes were included. The questions were a mix of multiple choice and free text format.

The study adopted the four steps for survey questionnaire design (Cooper, Schindler, & Sun, 2006).

Step 1: Research questions (SRQ): Questions that act as the bridge between the research objectives of the survey.

Step 2: Investigative questions (IQ): Questions that adequately operationalise the research questions.

Step 3: Measurement questions (MQ): Analysable questions for the participants that are linked to the Investigative questions.

Step 4: Survey questions (SQ): The exact form and content of the questionnaire.

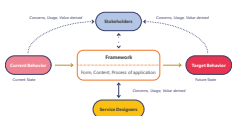


Table 4: Hierarchy and Linkage to Survey Questions

Research Question	(One of them) Investigation Question	(One of them) Measurement Question	Final Survey Question (measurement through a Likert Scale)
To what extent the practitioners understand the distinctiveness of Service Design?	What does one mean by understanding? What does one mean by extent? What does one mean by distinctiveness ?	Do practitioners understand that Service Design and UX design are different? - Scope - User Research Methods - Design Concepts - Design Detailing - Design Validation	I believe Service Design and UX design are different in the following aspects - Scope - User Research Methods - Design Concepts - Design Detailing - Design Validation

The scope of the survey encompassed:

SRQ1: To what extent do the practitioners understand the distinctiveness of Service Design?

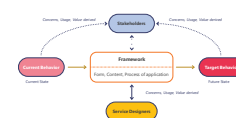
SRQ2: Do their clients understand the need for behaviour change?

SRQ3: To what extent do practitioners know behavioural change theories?

SRQ4: To what extent do practitioners understand behavioural change practices?

Table 4 illustrates the hierarchy and linkage to survey questions for SRQ1 and measurement questions pertain to the distinctiveness aspect of the investigative questions. The extent aspect was covered through the Likert scale (*Significantly different, Moderately different, Almost Identical, Identical, I do not know*). Other questions in the questionnaire followed a similar hierarchical linkage.

A pilot study was conducted with five respondents to identify issues in the content, articulation and administrative aspects (time required to fill the questionnaire, ease of online answering ...). The survey questionnaire was revised based on the results of the pilot study. Designers who were likely to be working in services organisations or for clients in the services business were identified as the subjects for the survey. Anecdotal and informal data suggests that the designers in India moving towards Service Design are from UX design and allied disciplines. Convenience sampling and snowball method were initiated with this set of designers. Designers with a



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minimum of two years of experience were identified through industry contacts. It helped to make sure that participants with adequate exposure to industry and design practice were identified. The link to the online questionnaire, along with a covering note, were sent to them. They were requested to forward the questionnaire to other designers who matched the criteria. Respondent anonymity was ensured throughout.

The questionnaire reached 100 plus designers and received 33 fully completed responses. Nine respondents voluntarily and of their own initiative provided additional information over email and phone, which was analysed subsequently.

3.3.3 Analysis and interpretation

3.3.3.1 Understanding of Service Design and its practice

The Service Design discipline in India appears to have moved further on from just a nascent stage in the consciousness of practitioners. The practitioners seem to be familiar with the domain and appear to be moving towards maturity in acquiring additional knowledge and its application.

65% of respondents believed that the scope of Service Design and UX design are different, and 85% of respondents were aware that the User research methods are similar for Service Design and UX design. As indicated in Chart 1, close to 40% of respondents were aware of the vital Service Design methods and concepts, but a comprehensive awareness was lacking. Therefore, it appears that the awareness of Service Design and interest therein is growing, and that practitioners might be on the path to maturity.

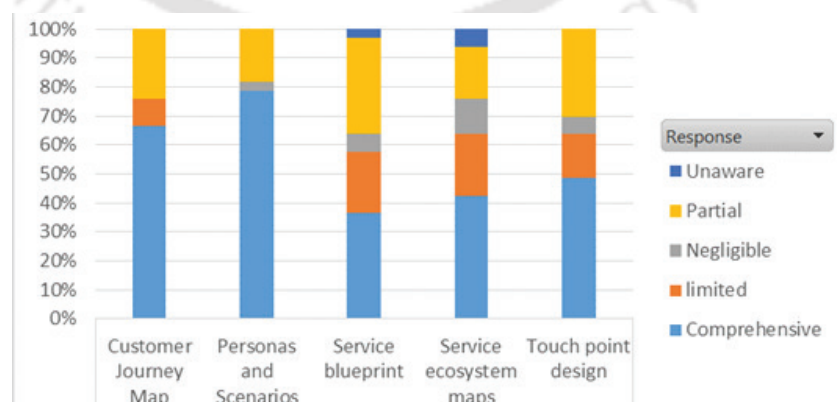


Chart 1: Practitioners Knowledge of Service Design Methods and Techniques

It seems that a significant proportion (50% of respondents) are getting opportunities to apply their knowledge of Service Design processes, methods and techniques. However, only 6% of respondents indicated Service Design as their primary expertise, which means that the practitioners were probably trying to acquire necessary knowledge and skills in Service Design on their own. It is a positive sign for the future maturity of the field in India.

3.3.3.2 Understanding of behavioural change aspects

The responses pointed to several contradictions which indicates a significant lack of understanding, misunderstanding and limited or low level of knowledge about Design for Behavioural Change.

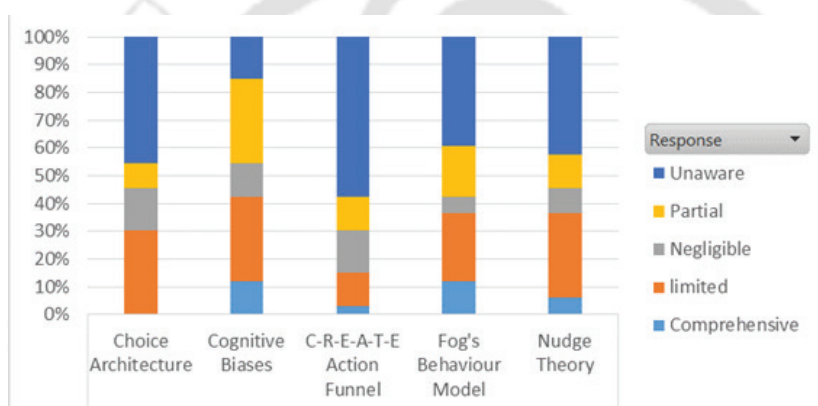


Chart 2: Practitioners Knowledge of The Theories Related to Influencing Behaviour

Interestingly, 36% of respondents indicated that design briefs for their projects explicitly specified behaviour change outcomes. This indicates that there is a demand for Service Design for behavioural change, but the conflicting and confusing signals that came from the survey analysis could inform the stakeholders of possible directions for corrective interventions.

More than 50% of respondents are unaware of the knowledge of well-known behavioural theories and models, as shown in Chart 2. About 5% claimed to have comprehensive knowledge of some of them, and only 6% of respondents had seen theories related to influencing behaviour applied in practice. It correlates with the lack of awareness about it. Cognitive biases seem to be relatively better known since 40% of the respondents were aware of them. However, 40% of the respondents indicated that they had to modify the generic way of designing services that successfully influenced user behaviour during the last two years. The implied claim that they were able to assess the need and act on it seems contradictory to their level



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52% of respondents indicated that their user research team was not keen on looking for information relevant to influencing user behaviour. However, 33% of respondents believe that they can uncover aspects related to influencing behaviour. 40% of respondents occasionally validate their Service Design solutions from the perspective of influencing user behaviour. However, one cannot be sure of what exactly is being validated because of the widespread lack of understanding of behavioural theories and models and hence need in-depth assessment.

3.3.3.3 Challenges in an organisational setting

It was clear from the responses that generic Service Design processes need to be adapted to suit the organisational settings. It also pointed out the improvement areas such as creating the predefined design success criteria and ascertaining the success of the design solution after it goes live.

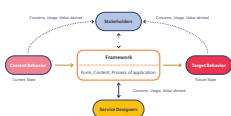
Organisational settings demand collaboration between the multidisciplinary team and non-collocated teams. Therefore, it was not surprising that 42% of respondents had to modify generic design processes to suit their own setting. 40% of respondents made a trade-off in primary user research, and 30-40% respondents have done a trade-off in all aspects of the design life-cycle. In order to draw meaningful conclusions, these aspects need further investigation to ascertain whether it is a widespread phenomenon or confined to certain kinds of organisations or design situations.

A significant proportion (37%) of respondents stated that they do not ascertain the success of the design solution after it goes live. An alarming revelation is that 73% of designers rarely if ever use any predefined design success criteria.

Most of the respondents (73%) were employed by the IT Product or Services Companies. Interaction design emerged as the most common design expertise, with 82% of respondents stating it as their primary expertise. Interestingly, 6% of respondents indicated Service Design as their primary expertise which suggests their growing interest despite their lack of formal educational opportunities in Service Design.

3.3.3.4 Insights from qualitative data

Qualitative data provided triangulation and enriched the insights. These included knowledge gaps concerning as well as ignorance of specific concepts and practices; and the current organisational challenges in implementing Service Design and design for behaviour change.



Apart from the survey data, nine respondents reached out voluntarily through emails and over the phone to convey their reflections upon the experience of answering the questionnaire.

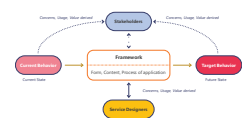
Three of them shared that the survey helped them to realise the knowledge gaps and ignorance of specific concepts and practices. Their expressions were “... *I enjoyed answering the questions. It was enriching...*” An experienced designer expressed their inability to execute the Service Design projects as, “*Since the number of projects with Service Design scope in our context are very few, in most projects, it was up to us to stretch it. ...*”

However, six respondents who had not completed the survey expressed their inability to complete the survey and shared multiple reasons. One of them said, “*I have not completed the survey because the questions are difficult for me to understand (because of lack of knowledge) and to provide correct responses... I may be the dumbest of the lot to whom you had circulated the questionnaire...*” Another designer said, “*Lot of terms looked new to me and hence not able to answer the questionnaire*”. Passionate designers called us and said, “*I tried filling this survey, but a lot of questions did not make sense to me.*”

Interestingly, a designer questioned even the scope of Service Design as “*Started filling the survey questionnaire, but most of these concepts I have never come across. Is it really relevant for Service Design?*” After interacting with them, it emerged that it was not the articulation of the questionnaire which bothered them, but it was the content, which did not match with their understanding of Service Design. It clearly shows an intervention is required to educate designers about Service Design. Apart from these personal reasons, a designer expressed the organisational challenges in a detailed email, the gist of which was “... *the truth of the matter is, in my professional orgs they are still struggling to implement Usability/UX as a practice. They end up doing some bits and pieces of Service Design in the sense of multi-channel UX ...*”. However, disheartening, arguably, the quote broadly characterises the current state of affairs regarding the Service Design practice in India.

3.3.4 Survey Conclusion

Service Design, as well as Design for Behaviour Change as disciplines and practices, have progressed on the path of maturity. Therefore, they are positioned to contribute to addressing wicked problems of behaviour change in society as well as the organisational context. The Design profession has matured in India, and disciplines such as product design, usability, and UX design are contributing to businesses and society. However, Service Design appears to have moved further on from just a nascent stage in the consciousness of practitioners, but Design for Behaviour Change appears to be in a nascent stage. Because of the maturity of the



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design disciplines and practice, the foundation for professionals to venture into Service Design for Behaviour Change is in place. With appropriate interventions, professionals in India could further Service Design maturity and be able to address the wicked problems India faces.

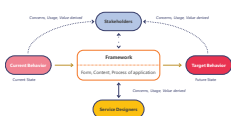
This study helped to understand the knowledge gap in Indian design professionals regarding Service Design and design for behavioural change in a broad and indicative manner. This has indicated the need for a comprehensive Service Design education, including a focus on behaviour change. The growing Indian service economy has created various opportunities for businesses. India also faces a plethora of wicked problems. Together, these present various opportunities for Service Design professionals to make a difference. It seems several enabling conditions such as Government enablers, the maturity of design education, and the presence of supportive industry and professional bodies are in place. This study clearly showed the need for a Service Design framework in an actionable form to make this knowledge readily available for designers.

3.4 Global Design Practitioner Survey

We also investigated the global picture of appreciation, the state of relevant knowledge and skills, and practice among the western design professionals regarding Service Design and design for behaviour change. This study was exploratory in nature to understand the needs for designing services to influence behaviour change and adequacy of currently available processes, methods, tools and techniques. However, it is a significant initial step to emphasise the global need of and gaps in the aspects of effective Service Design for behavioural change. This investigation helped to get some answers to the initial research questions listed in Chapter 1 (Introduction) in a global context.

3.4.1 The objective of the Survey

The objective was to carry out an exploratory study to obtain the current global picture of appreciation, the state of relevant knowledge and skills, and practice among the Service Design professionals regarding Service Design for behaviour change. This study aims to understand how global Service Designers perceive a gap in the existing Service Design processes, methods and tools. This study was an exploratory study the corollary aim of which was to identify directions for future research and hopefully suggest some indicative actions to further the global Service Design research and practice.



3.4.2 Methodology

Like the methodology followed for the Indian design practitioner survey, as explained in section 3.3.2, this research was also based on a mix of qualitative and quantitative data. A survey questionnaire was developed and administered amongst global Service Designers. Some of the critical details sought were: a view on Service Design and Service Design practice oriented towards behavioural change, the nature of the organisation where they work, and their current role. To understand the various dimensions of the current state of the Service Design practise globally and design for behaviour change; this study included aspects such as customer demand, the design process, the influence of organisational contexts and the outcomes. The questions were a mix of multiple choice and free text format.

Table 5: Hierarchy and Linkage to Survey Questions

Research Question	Investigation Question	Measurement Question	Final Survey Question (measurement through a Likert Scale or free text)
To what extent the behavioural change incorporated in the Service Design discipline?	Understand the current state of Service Design research	<p>What are the current research themes in Service Design-related research?</p> <p>What are the future research themes in Service Design-related research</p>	<p>The current top research themes related to Service Design related are -----</p> <p>-----</p> <p>The future research themes in Service Design-related research would be -----</p> <p>-----</p>
		<p>Are there any gaps in available Service Design methods. Processes, tools and techniques? Pl. elaborate</p>	<p>Are available Service Design methods, processes, tools and techniques adequate?</p> <ul style="list-style-type: none"> • Yes • No • Partially • Not sure <p>Please elaborate if you have answered Yes, No or Partially - -----</p>
To what extent the behavioural change incorporated in the Service Design discipline?	Understand the current state of Service Design research oriented towards behavioural change	Is there any congruence of Service Design and behaviour change?	<p>I believe Service Design and Design for behaviour change have significant congruence?</p> <ul style="list-style-type: none"> • Strongly Agree • Agree • Neutral • Disagree • Strongly Disagree



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	Service Design projects which focus on Behavioural change are increasing, decreasing or the same during the last three years	During the last three years, the number of Service Design projects I worked on which focused on behavioural change have <ul style="list-style-type: none"> • Increased • Decreased • Remained the same • Not sure
	Which additional skills and knowledge are required to handle these type of projects	Following additional skills and knowledge are required to handle these type of projects -- -----
	What are the trends you are observing in relation to Service Design	I observe the following trends in relation to Service Design discipline -----

The study adopted the four steps for survey questionnaire design (Cooper, Schindler, & Sun, 2006) as explained in the Indian design practitioner study (section 3.3.2).

The scope of the survey encompassed:

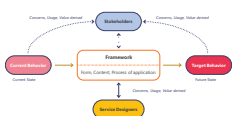
RQ1: What is the current state of Service Design discipline in the western world?

RQ2: To what extent is behavioural change incorporated in the Service Design discipline?

A pilot study (N=5) was conducted to identify issues in the content, articulation and administrative aspects (time required to fill the questionnaire, ease of online answering ...). The survey questionnaire was revised based on the results of the pilot study.

Table 5 illustrates the hierarchy and linkage to survey questions for RQ2.

The sample comprised Service Designers who attended the Service Design networks (SDN) conference at Madrid in 2017 and their colleagues. It was a convenience and snowball sampling method used to identify Service Designers for this study. Service Designers with no minimum experience criteria but with adequate exposure to industry and Service Design practice were selected for this study. The survey questionnaire reached 75 plus global Service Designers and received 35 fully completed responses and we conducted informal interviews with eight Service Designers. Over eighty-five per cent of respondents shared their email IDs to receive the survey results and contact for clarifications required if any (though it was optional). It was a clear indication that respondents found this survey useful



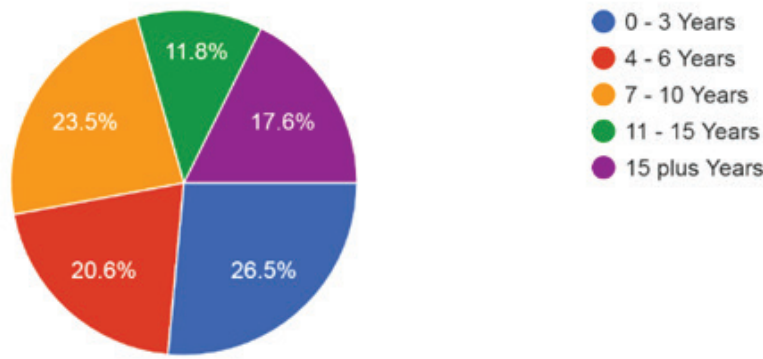


Chart 3: Respondent Service Design Experience

and were interested to know about the final survey results. However, respondent anonymity was ensured throughout the study.

3.4.3 Analysis and Interpretation

3.4.3.1 Understanding of Service Design and its Practice

Service Design discipline has matured in the west, and their significant portion of work is mainly related to Service Design. Though it was a biased sample since most of the survey respondents were from the Service Design network conference. Nevertheless, it gave a good indication of Service Design expertise and what is the state of Behaviour Change projects and knowledge. As shown in Chart 3, 73.5% of respondents had three-plus years of design experience, and 30% of respondents had ten plus years of design experience, gave significant credibility to the survey results.

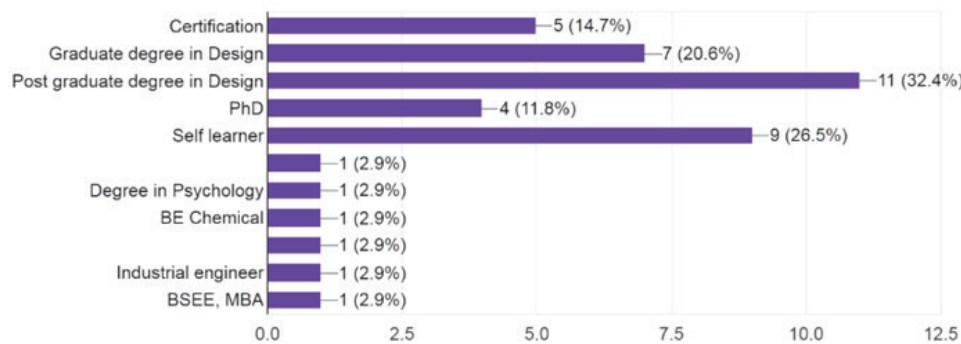
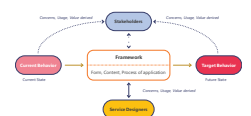


Chart 4: Formal Design Education Of Respondents



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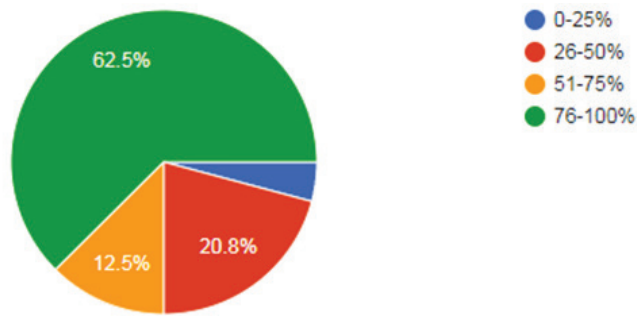


Chart 5: The Proportion of Projects Which are Primarily About Service Design of the Respondents Work

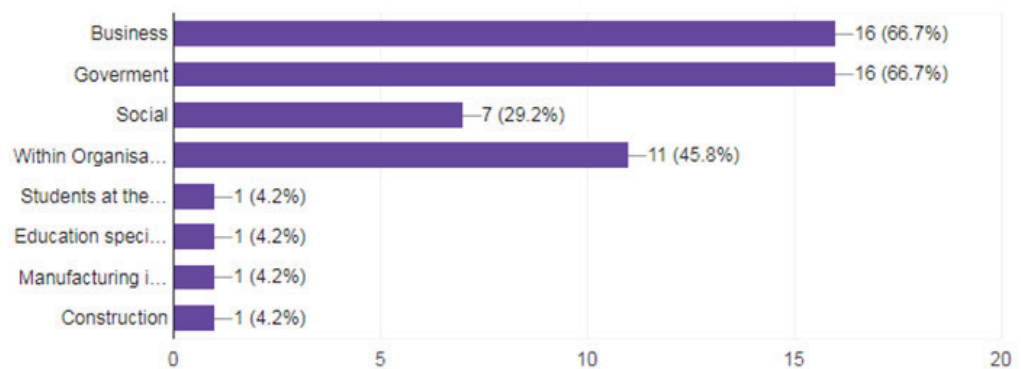


Chart 6: Service Design Projects Practitioner Do, Primarily Fall In The Sectors

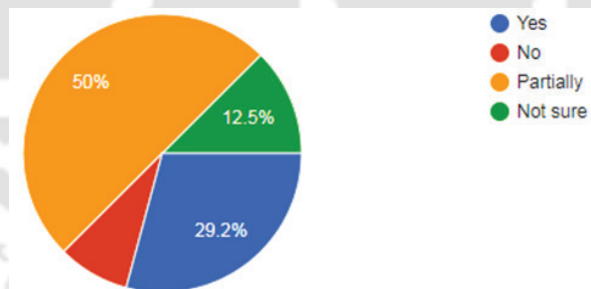


Chart 7: Adequacy Of Available Service Design Methods, Processes, Tools And Techniques

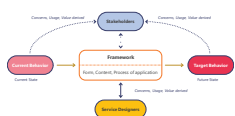
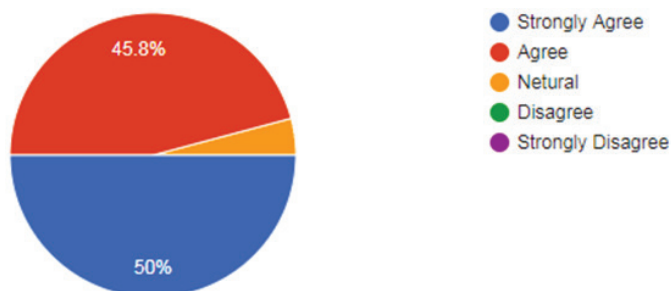


Chart 8: Congruence Of Service Design And Design For Behaviour Change

The respondents had varied formal design education background, as shown in Chart 4. More than 70% of respondents reported that they had formal design education and close to 26% responded indicated that they were self-learners.

As shown in Chart 5, more than 75% of respondents reported that they were primarily (more than 50% of projects) working on Service Design projects, giving authenticity to the survey result.

On the expected line, more than 66% of respondents are working on services in businesses and government sectors, as shown in Chart 6. Despite the pressing need in the social sector, approximately 30% of respondents were working on social sector projects. Surprisingly, more than 45% of the respondents were working on services within organisational contexts, indicating that organisations are focusing on the employee experience.

As shown in Chart 7, overwhelmingly 50% respondents stated that currently available Service Design methods, processes, tools and techniques are partially adequate, and hence there is scope to fill this gap.

Overwhelmingly 96% of the respondents (strongly agree or agree) believe that there is significant congruence between Service Design and Design for behaviour

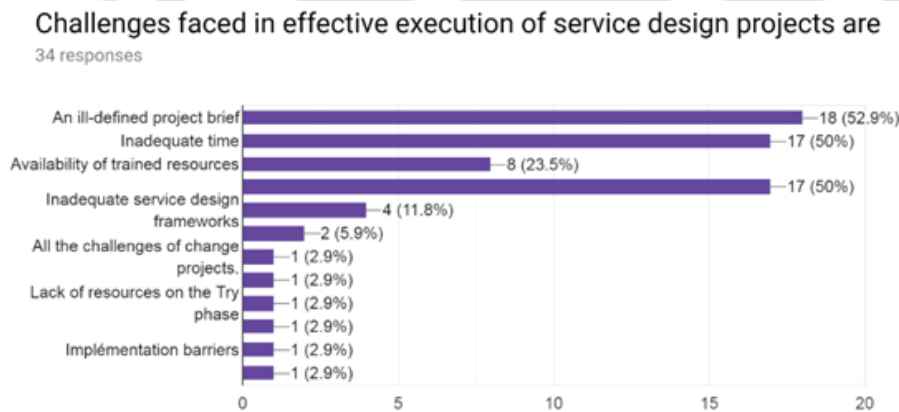


Chart 9: Challenges Faced In Effective Execution Of Service Design Projects

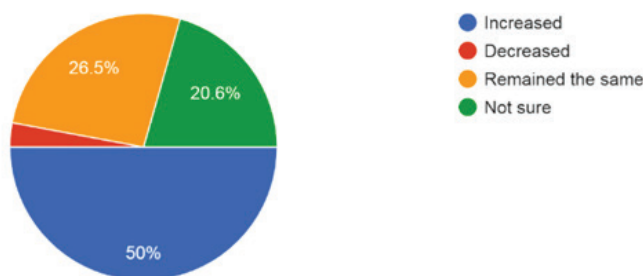


Chart 10: Service Design Projects With Behaviour Change Focus



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change (refer to Chart 8), which is a substantial endorsement of the usefulness of this thesis work.

As shown in Chart 9, in the portion of projects which are primarily about Service Design, respondents are global Service Designers working on the Service Design practice, and hence their endorsements are valuable feedback for the research topic of this thesis.

AAs shown in Chart 10, 50 % of respondents said that the Service Design projects with an emphasis on behaviour change are on an upward trend.

Following are the few survey respondents.

Adam Lawrence - Author of the book 'This Is Service Design Doing: Applying Service Design Thinking in the Real World'

Marc Stickdorn - Author of Book 'This is Service Design Thinking'

Anna Meroni - Author of Book 'Design for Services'

Stina Vanhoof - 'Service Design podcast'

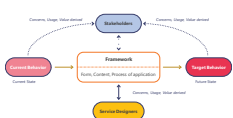
Mikko Koivisto - one of the pioneers of Service Design in Finland.

3.4.4 Conclusion

The survey helped to validate the research space and need for Service Design for behaviour change. It was clear that the current tools and techniques are not adequate for Service Design for behaviour change. There are problems in the social and business sector where this framework will be useful.

3.5 Research Gap and Research Questions

The research gap is identified through multi-pronged ways, i.e. secondary research through literature review and exploratory primary research through design practitioner surveys and organisational case studies. Overall, the research gap was identified rigorously, and hence the identified gap is significant, which was triangulated from multiple sources. This multi-pronged strategy helped to discover the missing intermediate layer of knowledge which can bridge the theory and practice. As shown below, the need for actionable guidance came out very strongly.



- Service Design for sustained behaviour change is relevant and a much-needed research topic: Literature review, Global and Indian practitioner

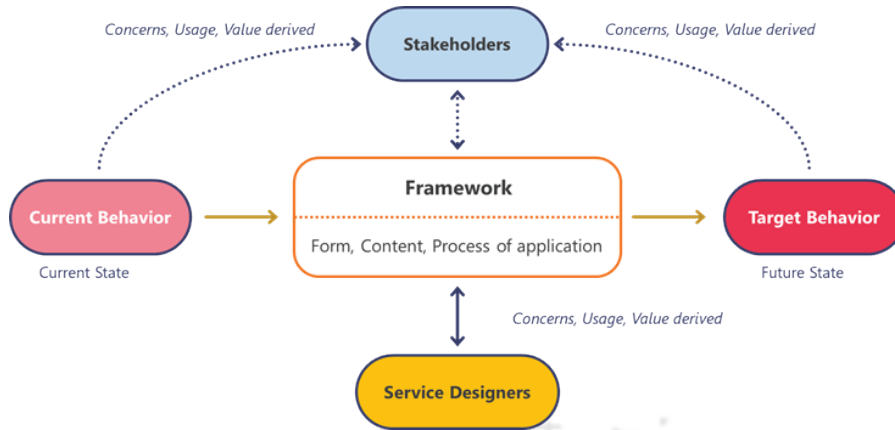


Figure 8: Concerns And Expectations Of All Stakeholders

surveys, organisational Service Design case study

- Current knowledge is inadequate: Literature review Global and Indian practitioner surveys
- Current tools and techniques are inadequate, and there is a need for an integrated framework: Literature review as shown in Chart 11, Global and Indian practitioner surveys, organisational Service Design case study

There are multiple stakeholders with their specific concerns concerning the current and future state of the behaviour. The framework needs to address these concerns by addressing the usage concerns through the form, content and the process of application, as shown in Figure 8. The framework needs to deliver value to all the stakeholders, including the Service Designers. The value delivered can be realised through the usefulness and effectiveness of the framework.

The Framework needs to embed knowledge through the form, content and the

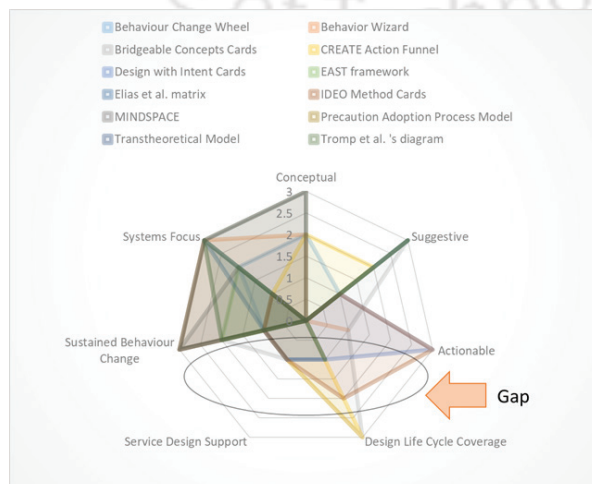


Chart 11: Gap Analysis Of Existing Frameworks And Tools



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process of application to address the need emerging through the theory (literature) and practice (surveys and case study).

Chart 11 depicts a comparative study of the following models and frameworks on the aspects such as conceptual, suggestive, actionable, design life cycle coverage, Service Design support, sustained behaviour change and system focus. It compared the Precaution Adoption Process, Transtheoretical Model, Behaviour Wizard, Behaviour Change Wheel, Design with Intent Cards, Bridgeable Concepts, IDEO Cards, EAST framework, MINDSPACE, Tromp et al. 's diagram, Elias et al. matrix and CREATE Action Funnel. It clearly shows the gap for the actionable guidance covering the complete Service Design life cycle aimed at sustained behaviour change.

3.5.1 Research Questions

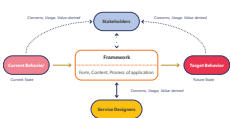
RQ1-a: What should be the form of integrated **actionable guidance** of behaviour change principles, models and frameworks from relevant disciplines made available to the **Service Designers**?

RQ1-b: How should behaviour progression be facilitated towards **sustained behaviour change** for the **common good** of all stakeholders?

3.6 CraftChange – Framework Name as High-level Design Guidance

Now the need for the framework is well established, and this research is mainly focused on designing and development of a framework which will facilitate progression towards a sustained behaviour change. We decided to tentatively name the framework so that it acts as high-level design guidance during the entire research.

As one may agree, the craft's role is far from obsolete since it bonds one to one's history, tradition and culture, makes one more physically aware, and empowers one creatively (Budds, 2017). The researcher comes from an artisan family, and his close interaction with the other artisans helped to express the following views about the Craft. Craft helps to explore human experience beyond the visual and the intellectual, to more experiential levels. Most importantly, it helps to keep alive the tradition. Craft makes people more satisfied because they can see what they have created. Despite the existence of digital technologies, certain long-lasting, unique impressions and a sense of beauty can never be realised without a craftsman's continuous dialogue with their raw material. Craft develops one's ability to work with one's hands and hold the knowledge in one's own body about how to play with the materials. It is an intimate knowledge and can be fun. Craft empowers and gives the confidence to make something.



“Craft is more than just a way of making things; perhaps it’s a way of thinking. It questions the different processes of dealing with the material world, and it brings back a certain level of human dignity. Craft calms down our high-speed society. In a way, the craft is a tool to connect the heritage of the past with our present. The mysterious charm things created through trial and error, while relying on experience and intuition, is an absolutely necessary element for our lives. Craft is an event that starts with a physical sense of the relationship between materials and people. This spirit and physicality are related not only to creative activities but also to the foundation of human activity.”

(Budds, 2017)

Craft as a noun (UK Dictionary) means, “an activity involving skill in making things by hand”. It is also “a job or activity that needs skill and experience.” Alternatively, “something produced using skill and experience”. ‘Craft’ as a noun (US Dictionary) means “skill in knowing how to do or make something”.

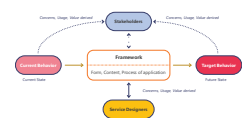
Designing services for sustained behaviour change seems to be a delicate activity which requires multidimensional skills such as design, Service Design and behaviour change. So, it is an activity which needs skill and experience to design services and facilitate sustained behaviour change. The verb ‘Change’ means to make or become different. This framework has been tentatively named as a ‘CraftChange’ to metaphorically connect with craft, which involves skills, experience, knowledge, action and emotions.

Henceforth for the ease of convenience, the framework has been referred to as the ‘CraftChange’ Service Design framework. It will be a guiding light for the researcher during this research endeavour. Whenever in doubt, the ‘CraftChange’ name as a design guidance can help to make appropriate decisions and also understand the early reactions of the framework users.

3.7 Chapter Conclusion

This Chapter explores a multipronged approach to identify research gaps in the area studied. These gaps were identified through a review of the literature, a case study of an organisation and understanding how non-designers are practising Service Design for behaviour change; and surveying the Service Design practitioners across the globe. This ‘Research Gap Analysis’ used insights from multiple sources to identify the significant gaps and frame the research questions. It has identified the challenges faced by the Service Designer to influence more sustainable behaviour through Service Design. The need for inter-disciplinary knowledge transfer in design for behaviour change emerged. It was primarily pointing out the need for guidance, or ‘toolkit’, to bring together behaviour change knowledge in a form which is of use to designers. The next Chapter examines a suitable research methodology to seek

answers to the identified research questions.



Research Gap

4 Research Methodology

This research aims to develop a simple, practical and workable framework for Service Design. The focus is to make it available in an accessible form to Service Design practitioners engaged in designing services aimed at behaviour change. It also takes into account the perspectives of multiple stakeholders whose response may be influenced by knowledge domains related to Behavioural Science, Psychology and Service Design.

Due to the nature of this transdisciplinary research enquiry, we shortlisted the Action Research methodology. Action Research methodology is “*proceed[ing] in a spiral of steps each of which is composed of a circle of planning, action, and fact-finding about the result of the action*” (Lewin, 1946). During Action Research, the researcher is not a detached observer but involves as an active participant. The Action Research researcher,

“attempts to develop results or a solution that is of practical value to the people with whom the researcher is working, and at the same time developing theoretical knowledge. Through direct intervention in problems, the researcher aims to create practical, often emancipatory, outcomes while also aiming to reinform existing theory in the domain studied”
(Davison, 1998).

This research pursued the investigation through multiple iterative cycles of ‘Plan-Act-Observe-Reflect-Refine’ through participatory co-design formative and summative workshops. The research methodology followed can be broadly summarised as ‘Plan research activities → Act as planned → Observe during activities → Reflect on the observations → Refine and repeat the cycle → Focus on reflection for new knowledge’.

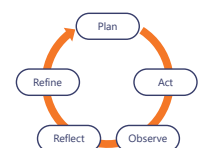
This Chapter deliberates various design research methodologies and methods applied in the pursuit of getting answers to the research questions described in this thesis. A four-element model of (Crotty, 1998) helped to explore and identify the relevant research process. Considering various aspects of research methodologies, mainly a constructionist, interpretivist, action research methodology was found most appropriate.

A contextual literature review was done to examine design research methodologies relevant to the identified problem space. This investigation included not only theoretical viewpoints but various methodologies, methods and design practices. Considering the main focus was on actionable guidance for Service Designers, the research was more inclined towards a real-life natural way of doing Service Design. In the same spirit, this thesis considered iterative research methodology and principles of Action Research design methodology. It was at the heart of conceptualising, designing, developing and evaluating the *CraftChange* Service Design Framework through multiple ‘*Plan-Act-Observe-Reflect-Refine*’ cycles. The research plan evolved like a ‘*rolling wave*’ based on reflections on the observations of the previous cycle. Though the identified research methodology involved a mix of qualitative and quantitative methods, it was mostly inclined towards qualitative methods. Research methods like workshops with multiple participants focusing on participant observations, surveys, interviews, focus groups and thought experiments were used in this research. The workshops were conducted in an industry setting as well as in academia, where participants designed services using the *CraftChange* Framework starting with a design brief concerning behaviour change. Reflections from these workshops refined the *CraftChange* Framework. The *CraftChange* Service Design Framework is the primary research output of this research, which was iteratively evaluated through multiple formative and summative assessment studies.

4.1 Nature of Design Research

“Research is a systematic enquiry whose goal is communicable knowledge: systematic because it is pursued according to some plan; an enquiry because it seeks to find answers to questions; goal-directed because the objects of the enquiry are posed by the task description; knowledge-directed because the findings of the enquiry must go beyond providing mere information; and communicable because the findings must be intelligible to, and located within some framework of understanding for, an appropriate audience.” (Archer, 1995)

Archer’s definition of Design research is apt for this thesis since the primary emphasis was given to make the ‘*Service Design for behaviour change*’ framework communicable for the Service Designer as an audience. As is well known, design research draws on multiple disciplines, especially from social sciences and despite multiple attempts to define it (Friedman, 2008), there is a lack of common consensus on the boundaries of ‘*design methodology*’ (Kimbell, 2011). Design practitioners are using these methodologies, contextualising for the problem at hand and contributing to it whenever possible. In reality, most practices are surviving through an oral culture of knowledge dissemination. Generally, practitioners employ the approaches internally first, and then it gets evolved into something different over time than what was envisaged first (Gray, Brown, & Macanuso, 2010).



Methodology

The design methods used in this thesis are drawn from several fields and research paradigms, academic and from design practice, necessarily not wholly from one tradition though mainly inspired by action research. General expectations from a Design PhD are to demonstrate the integration of *'imagination-and-reason, technology-and-art, and to make evident improvements to the quality of industrial life and its products'* (Jones & Jacobs, 1998). There is a growing number of design PhDs imbibing and advocating *'practice-based'* or *'practice-led'* research approaches. Researchers use *'practice-based'* and *'practice-led'* interchangeably to describe the design research approach leading to the confusion. In the researcher's view, when a design artefact as an output is the primary basis of the knowledge contribution, then it is *'practice-based'* design research.

On the contrary, when not the final design artefact, but the practice itself is a subject of knowledge contribution, then it is *'practice-led'* design research. There is an increasing recognition that Design PhDs are fundamentally practice-based, and are arising either through studying the people, process or products where knowledge resides (Cross, 1982). Design PhDs are indicative of this approach, becoming more widely accepted within the academic community (Jones & Jacobs, 1998). Joyce Yee (2009) examined six PhD theses in the design field and synthesised them according to the involved research methodology and approaches. It helped to be aware of recent methodological innovations in the design field and the permissible leeway for a flexible approach to practice-led research. Joyce Yee found four characteristics in Design PhD methodology: thesis-structural innovation, a *'pick and mix'* research design approach, situating practice in the enquiry and the validation of visual analysis (Yee, 2009). This thesis's design research approach is characterised as a *'pick and mix'* research design approach that is *"... assemblage which often combines methods from the social sciences, humanities and hard sciences to derive a suitable model of inquiry"* (Yee, 2009). Joyce Yee stresses the fact that there is a lack of established design research frameworks leading to methodological innovation surfacing due to the fusion of established research methods with practice-based methods.

Frayling's classification (Research in art and design, 1993-4) proposed three main types of research projects:

1. 'Research INTO practice', i.e. where the design practice is the subject of research
2. 'Research THROUGH practice', i.e. where the design practice is the vehicle for research
3. 'Research FOR THE PURPOSE of practice', i.e. where the aim is to communicate the research embodied in a design object



since even the research objectives of this thesis are mainly in line with ‘Research THROUGH practice’ with some gist of ‘Research FOR THE PURPOSE of practice’. The research methods used in this thesis employs design practice as part of a quantitative and qualitative research methodology to uncover and test issues related to Service Design for sustained behaviour change. The CraftChange Service Design framework embodies the deduction of the reflections, which is a new way of designing services concerning behaviour change.

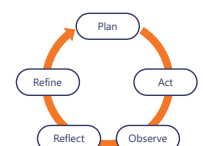
Frayling’s categorisation of design research has drawn criticism (Friedman, 2008), but despite this, research endeavours like this thesis have widely adopted it. The closest explanation for this thesis purpose is from (Keyson & Bruns, 2009, p. 4598):

“Research through design focuses on the role of the product prototype as an instrument of design knowledge enquiry. The prototype can evolve in degrees of granularity, from interactive mockups to fully functional prototypes, as a means to formulate, develop and validate design knowledge. The designer-researcher can begin to explore complex product interaction issues in a realistic user context and reflect back on the design process and decisions made based on actual user-interaction with the test prototype. Observations of how the prototype was experienced may be used to guide research through design as an iterative process, helping to evolve the product prototype.”

Based on this, multiple formative and summative workshops were planned to iteratively arrive and evaluate the CraftChange Framework through the designing solution for actual problems. A similar approach is used by Daniel Lockton while developing the design with the intent toolkit (Lockton, 2013).

The term practice-led design research methodology is widespread in design and is described as “research in which the professional and/or creative practices of art, design or architecture play an instrumental part in an inquiry, which can be undertaken by practitioner-researchers” (Robertson, 1993). In the practice-led research, the practice itself is used for enquiring (Durling, 2000) and plays an instrumental part in an inquiry (Rust, Mottram, & Till, 2007, p. 11).

The researcher of this thesis has one foot in design practice and one in academia since he is doing a PhD while being employed as a Service Design practitioner and researcher. This researcher is thus best placed and equipped to perform practice-led action research.



Methodology

4.2 DRM - a Design Research Methodology perspective

Design Research Methodology (DRM) helps to identify which type of research one is doing and what research stages one should be following. Figure 9 provides types of

Research Clarification	Descriptive Study I	Prescriptive Study	Descriptive Study II
1. Review-based	→ Comprehensive		
2. Review-based	→ Comprehensive	→ Initial	
3. Review-based	→ Review-based	→ Comprehensive	→ Initial
4. Review-based	→ Review-based	→ Review-based Initial/ Comprehensive	→ Comprehensive
5. Review-based	→ Comprehensive	→ Comprehensive	→ Initial
6. Review-based	→ Review-based	→ Comprehensive	→ Comprehensive
7. Review-based	→ Comprehensive	→ Comprehensive	→ Comprehensive

DRM - Types of design research projects and their main focus.

Figure 9: Types Of Design Research Projects And Their Main Focus And This Research (Blessing & Chakrabarti, 2009)

Table 6: DRM Phases and Research Activities

Phases	Description	Focus	As part of this Thesis
Research Clarification	Finding some evidence or at least indications that support assumptions in order to formulate a realistic and worthwhile research goal.	Review based	Secondary research through literature review.
Descriptive Study 1	Continue the literature review to make the description detailed enough to determine which factor(s) should be addressed to improve task clarification as effectively and efficiently as possible. Also, observe and interview designers at work to obtain a better understanding of the existing situation.	Review based	Along with the review of the literature also conducted the exploratory primary research through surveys and organisational case study. Arrived at the significant research gap through multi-pronged methods such as literature review, surveys and organisational case study.
Prescriptive Study	Represent vision on how addressing one or more factors in the existing situation would lead to the realisation of the desired, improved situation. Develop various possible scenarios by varying the targeted factor(s)	Review based initial / Comprehensive	Iterative Formative Studies followed as 'Plan research activities → Act as planned → Observe during activities → Reflect on the observations → Refine and repeat the cycle → Focus on reflection for new knowledge' to assess CraftChange Framework
Descriptive Study 2	Investigate the impact of the support and its ability to realise the desired situation.	Comprehensive	Iterative Summative Study followed as 'Plan research activities → Act as planned → Observe during activities → Reflect on the observations → Refine and repeat the cycle → Focus on reflection for new knowledge' to assess CraftChange Framework



design research projects and their focus (Blessing & Chakrabarti, 2009). This thesis research endeavour seems closer to type 4, as shown in Figure 9.

Table 6 provides the type of activities performed for each stage (Blessing & Chakrabarti, 2009) and what methods are used in each stage. It also lists the activities planned for this thesis.

4.3 Framework Development

Cambridge Dictionary defines a framework as “a supporting structure around which something can be built” or “a system of rules, ideas, or beliefs that are used to plan or decide something”. Merriam Webster online dictionary defines framework as “a basic conceptual structure (as of ideas)”.

A framework is also defined as “a purposeful collection of concepts, processes, methods and techniques, with a theoretical, empirical or quasi-empirical underpinning” (Khambete, 2013).

Drawing from these different definitions, the schematic diagram in Figure 10, is inspired by the framework continuum (Khambete, 2013).

As seen in Figure 10, the CraftChange Knowledge Framework draws from the Actionable framework in formulating theory and principles and this, in turn, informs aspects of methods and techniques for the CraftChange Actionable Framework as a mutually self-perpetuating loop. Such a framework can get instantiated and made available for the Service Designer.

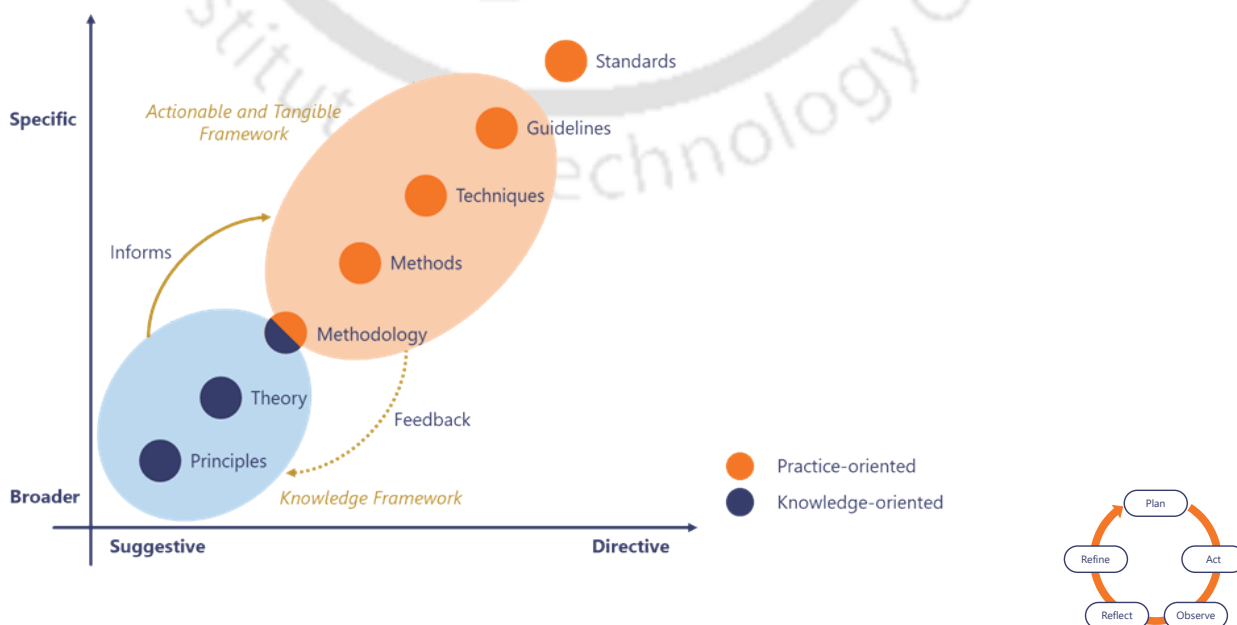


Figure 10: CraftChange Framework On A Continuum

Methodology

4.3.1 Distributed Cognition as a soul of Framework

Development

As explained in Chapter 2 – section 2.8 (Distributed Cognition as a Conceptual Framework for Service Design), this researcher observed strong evidence of the instantiation of DC concepts during the Service Design process, as a long duration, intermittent activity. In contrast with the short duration focus of Hutchin's and other studies. The Service Design is a prolonged duration activity and would need an adaption of the DC perspective. The Service Design process must recognise the need to deal with several mental models of participants and incorporate elements to externalise it appropriately after synthesis and apply it effectively as the design evolves. The multidisciplinary team would be exhibiting the implicit use of DC concepts during the Service Design process and would need mechanisms to externalise the internal thought process (mental models), harmonising them and maintaining the continuity across them. The study conducted by the researcher (Mahamuni, Khambete, & Mokashi Punekar, 2017), has pointed to the likely characteristics such externalisations should have to serve as capable vehicles to support distributed cognition. iterative development, synthesis of multiple individual mental structures and a form that can be 'intuitively' comprehended regardless of the domain of expertise (for example, Persona, Scenarios, CJM and Design Patterns in the case study) that seem to be the attributes.

The recommendations proposed in the paper (Mahamuni, Khambete, & Mokashi Punekar, 2017) seem apparent. However, reflecting upon the Service Design process at present; they add value for the long temporal Service Design process, spanning across multiple weeks.

- Reframe the problem statement as a catchy one-liner. For example, "How to enable an organisation to act as a magnet." Always displaying these, so that all the Service Design effort is driven towards it.
- Annotations such as date, place and purpose, provide backward traceability to the previously created representations and help refresh mental structures that would degrade with memory.
- Capture moments like group interactions from various vantage points through photos and annotate it to enhance the overall recall.
- Focus on the synthesis of all information instead of just consolidating them. This would help in arriving at common mental models.
- Externalise the explicable knowledge during every phase. This will help to recollect the designer's mental structures during the next phases of the Service Design life cycle.



- Capture the in-process artefacts. These include the evolution of sketches along with final artefacts, to record the mental structure progression during the Service Design process.
- Techniques like replaying of the actions done during the Service Design process would help reflect and refine the artefacts.
- Maintain the continuity and constant referral of mental structures by displaying all relevant artefacts at the design location.
- Have a diversity of mental models to help in arriving at a holistic design. A multidisciplinary team can provide a diversity of mental models.

To generate knowledge that can make the Service Design process be able to handle challenges of multidisciplinary settings; be more efficient; richer in content. Hence, this research integrated the externalisation and DC concepts as part of the framework architecture, as shown in Figure 11. The proposed CraftChange Framework architecture is essentially three-layered that enables addressing the research questions.

As shown in Figure 11, the top layer is ‘*Knowledge Integration Layer*’. This attempts to address the part of the research question 3.5.1, i.e., “*integrated ... behaviour change principles, models and frameworks from relevant disciplines ... who are facilitating the progression towards the sustained behaviour change*”. This layer draws knowledge from various disciplines and integrates them. It also enables scope for future integration of knowledge, for example, from ‘artificial intelligence’ or ‘future technologies’. This integrated knowledge informs the next layer - ‘Process Layer’ that considers the full-Service Design life cycle.

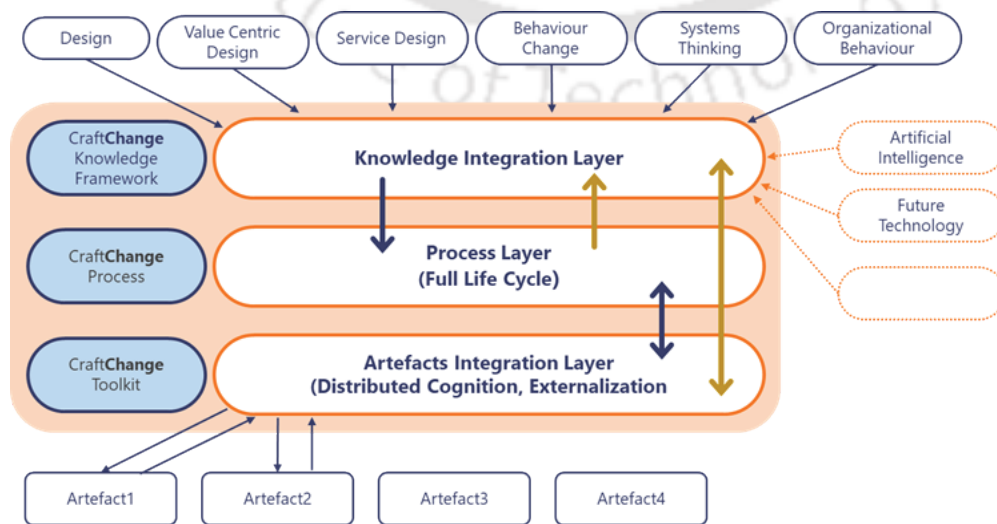


Figure 11: CraftChange Framework Architecture



Methodology

The outcome of the ‘Process Layer’ also influences mutually the ‘Knowledge Integration Layer’ especially from the perspective of knowledge packaging and form.

As shown in Figure 11, ‘Artefacts Integration Layer’ is introduced to complement the essence of distributed cognition with the externalisation of knowledge benefits as elaborated in Chapter 2 (section 2.8 (Distributed Cognition as a Conceptual Framework for Service Design). The ‘Process Layer’ and ‘Artefacts Integration Layer’ together addresses the actionable part of the research question namely, ‘*what should be the form of integrated actionable guidance made available to the Service Designers....*’.

As shown in Figure 10, there are two frameworks ‘CraftChange Knowledge Framework’ and ‘CraftChange Actionable Framework’ where these two frameworks mutually inform and influence the content and form of each other. These two frameworks are mapped to the schematic architecture diagram as shown in Figure 11, in which the ‘CraftChange Knowledge Framework’ represents the ‘Knowledge Integration Layer’, and the ‘CraftChange Actionable Framework’ represents the ‘Process Layer’ and ‘Artefacts Integration Layer’ through the different framework components.

4.4 Iterative Framework Development Through Action Research

While actively involved in the research, which is iterative in nature, the focus of the thesis is on developing knowledge. Working in such an iterative fashion has a long history in multiple domains such as, the Plan-Do-Check-Act (PDCA cycle). This was then extended into the Deming cycle, or Deming wheel, in 1950 and then into the plan-do-study-act (PDSA) cycle or the Shewhart cycle for learning and

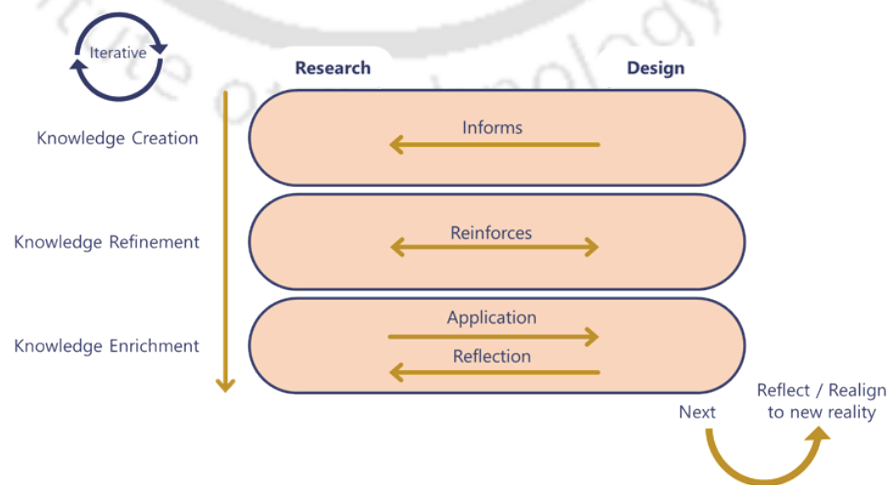


Figure 12: CraftChange Research Methodology

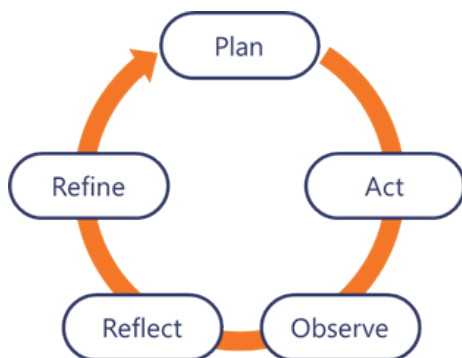


Figure 13: ‘Plan-Act-Observe-Reflect-Refine’ Cycles

improvement. There are similar concepts such as, a plan-act-observe-reflect cycle (Robson, 1993, p.438). Place, time, people and context plays a crucial role in action research (Archer, 1995, p.11) and hence, explaining the reasoning behind the action taken is essential. Action research can be a combination of subjective and objective approaches, depending upon the context.

As shown in Figure 12, the CraftChange Framework development for this research was based on the action research principle. It followed an iterative method starting from Knowledge creation; knowledge refinement and knowledge enrichment. The research method followed is a blend of research with a design focus made through actionable activities through the stages - ‘inform’, ‘reinforce’, ‘application’ and ‘reflection’ type of activities throughout all cycles of the study. Each of these cycles formed a source of getting inspiration for the next in developing the ‘Plan-Act-Observe-Reflect-Refine’ cycle, by giving prominence to refining the process, as shown in Figure 13.

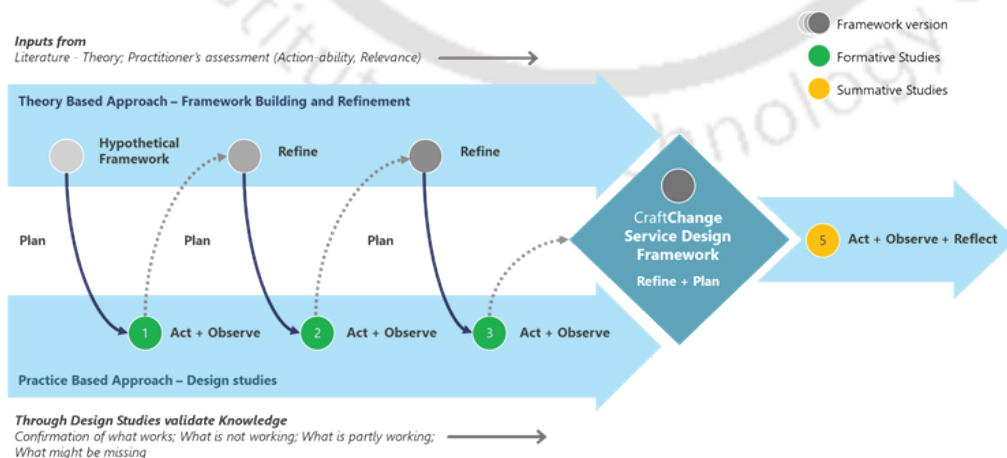


Figure 14: CraftChange: Action Research and ‘Plan-Act-Observe-Reflect-Refine’ Cycles



Methodology

The different iterations of the proposed cycle (Figure 13) were realised through multiple formative and summative workshops while developing the framework. This is schematically summarised and explained in Figure 14 - CraftChange: Action Research and ‘Plan-Act-Observe-Reflect-Refine’ Cycles.

The initial hypothetical framework was conceptualised first based on a literature review of various theories from behaviour science, Service Design and design for behaviour change as elaborated in Chapter 5 (Development of Knowledge Framework) and Chapter 6 (Development of Actionable Framework). The conceptual framework tried to integrate the various relevant behaviour change frameworks, Service Design process and various behaviour change principles and guidelines to converge into the actionable framework which was then further progressively validated and refined through multiple formative and summative workshops. Figure 15 depicts the proposed research methodology for this research.

Overall, the validation of the hypothetical CraftChange Framework happens through multiple formative and summative studies. As part of ‘Plan-Act-Observe-Reflect-Refine’ Cycles, interpretive analysis, insights from studies found necessary are used for refinements of the framework.

In this method, research is embedded in the act of designing where Research and outcome are essential, and they feed into each other. It addresses the need for creating

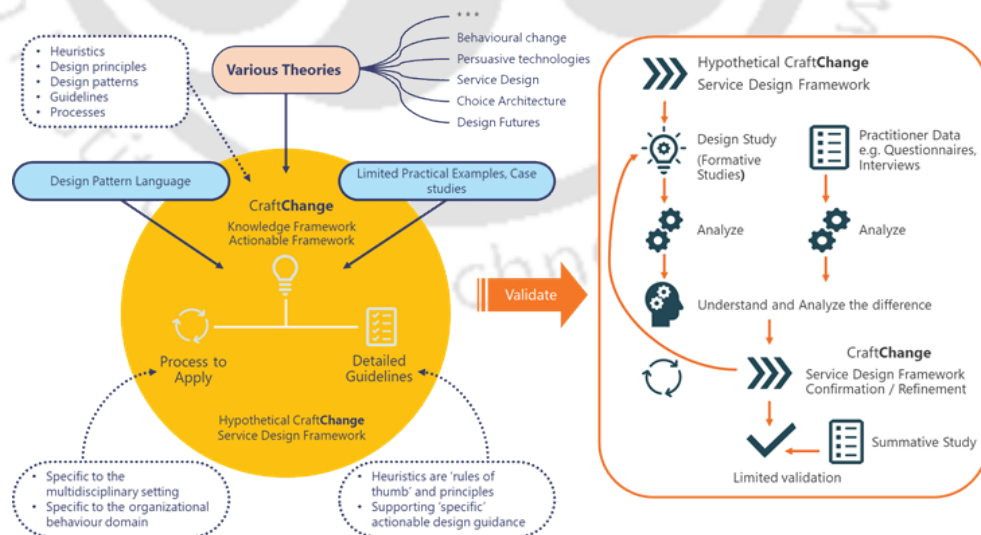


Figure 15: Research Methodology

a proven, actionable framework. It helps to study the actual design intervention in use and study it longitudinally. It progressively enables the framework to be more robust and relevant. The proposed CraftChange Framework consists of validated design guidance along with a validated process to apply.

4.5 Framework Assessment

Traditionally, validation of design and engineering research are anchored in the formalism of scientific inquiry. Such validation is expected to be “*formal, rigorous and quantitative validation*” (Barlas & Carpenter, 1990). “*The knowledge is innate and absolute and can only be verified by reason, reductionists are totally dependent on objective quantification*” (Seepersad, et al., 2006). Hence, in reductionism, validation is based on objectivity where knowledge is considered as true or false. Hence, the validation becomes an asserting ‘formal’ accuracy rather than demonstrating practical use or its application in practice or real life.

The notion of ‘innate and absolute truths’ has been challenged for a long time (Kant, 1781), (Hegel, 1817) (Kuhn, 1962) (Sellars, 1963). The counter-argument is that “*knowledge is socially, culturally, and historically dependent; hence, there are no neutral foundations of knowledge, and entirely objective verification of knowledge claims is not possible*” (Seepersad, et al., 2006).

This opens up the possibility of a semiformal, conversational and natural process, where validation is seen as a gradual process of building confidence in the usefulness of the new knowledge (with respect to a purpose) through the application in practice

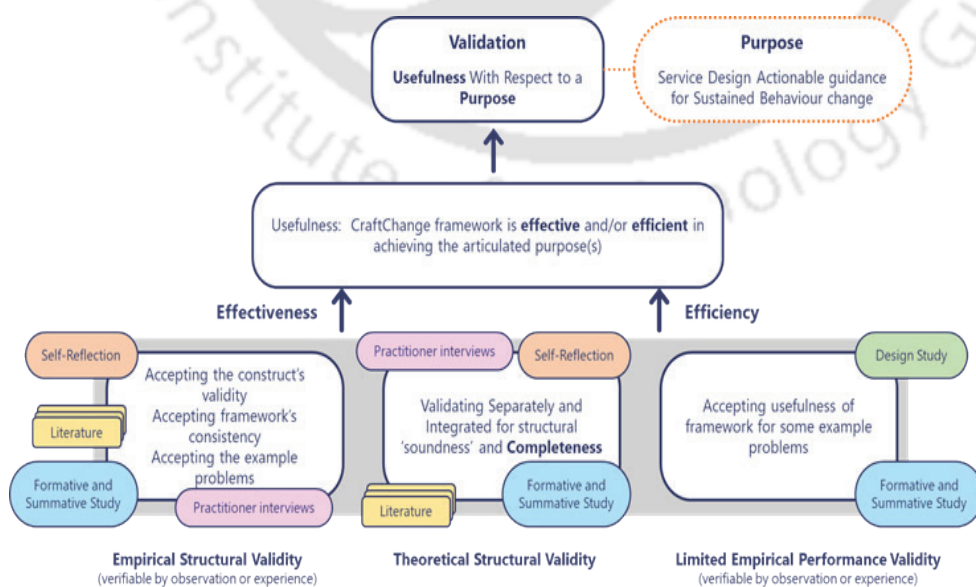


Figure 16: Validation Framework Adapted From ‘The Validation Square’

or real life (Seepersad, et al., 2006). This type of validation is more relevant for open problems, where new knowledge is associated with heuristics and non-precise representations as well as deliberately kept open for emergent understanding and application. Hence, 'external' relevance is ensured through asserting that the design solution is useful for its intended purpose.

Figure 16 is inspired by the Validation Square (Seepersad, et al., 2006). Based on (The validation square: how does one verify and validate a design method?), the proposed Framework planned to assess for building confidence in its usefulness with respect to a purpose. The purpose of the proposed Framework is '*Service Design Actionable guidance for Sustained Behaviour change*'.

The usefulness of a design method or framework relates to whether it provides design solutions correctly (effectiveness), and whether it provides design solutions efficiently, as shown in Figure 16.

To validate the effectiveness the CraftChange Framework constructs are validated through Literature support and framework's consistency through flow-chart representations focusing on information flow, ensuring that that information is available. It is also made sure that generated information is adequate, necessary, and is based on valid assumptions. The structural 'soundness' of the framework is ensured by validating components individually and integrated way.

Effectiveness of the CraftChange Framework is validated through the mapping of multiple case studies from literature and through observations. Hence, the researcher identified the following three characteristics of validation for the proposed framework.

- **Usefulness:** 'the quality of having utility and especially practical worth or applicability.' (Merriam-Webster, Incorporated).
- **Effectiveness:** 'adequate to accomplish a purpose; producing the intended or expected result' (Dictionary.com, LLC).
- **Completeness:** 'having all parts or elements; lacking nothing; whole; entire; full' (Dictionary.com, LLC).

As per the DRM, there are three types of evaluations i.e. Support evaluation, Application evaluation and Success evaluation (Chakrabarti & Blessing, 2016).



- Support Evaluation involves the continuous assessment of the support during its development focusing on in-built functionality, consistency, etc.

- Application Evaluation focuses on usability and applicability, i.e., the ability of the system to address the Key Factors as intended.
- Success Evaluation focuses on the usefulness of the support, i.e., its ability to realise the expected impact and fulfil the Measurable Success Criteria.

The Usefulness criteria is closer to the 'Success evaluation' which helps to validate whether it can help to achieve the final goal or have utility in real-life applications.

The Effectiveness criteria is closer to the 'Application evaluation' which helps to validate whether the proposed solution is adequate to use in real-life application and can influence the immediate key factors in an intended way.

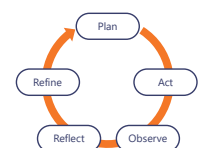
The Completeness criteria is closer to the 'Support evaluation' which tests consistency and completeness of the internal elements of the support and helps to identify if something is lacking.

For the purpose of this thesis, the following are the operational definitions of validation criteria

- The usefulness of the framework hints its utility in achieving the intended goal in real-life applications.
- The effectiveness of the framework hints its adequacy to accomplish a purpose in real-life applications by influencing the key factors in an intended way.
- The completeness of the framework hints its entirety in terms of required components with internal consistency.

The assessment of the CraftChange Framework for usefulness, effectiveness and completeness concerning the purpose of the framework is achieved through the following methods

- Literature review
- Self-reflection
- Reverse Case Study Mapping
- Practitioner interviews
- Action-based expert review through formative and summative studies.



Methodology

4.5.1 Literature review

The elements of the CraftChange Framework are based on the empirically validated theory, models and frameworks. It is explained in Chapter 5 - Development of Knowledge Framework and Chapter 6 - Development of Actionable Framework.

4.5.2 Self-reflection

The self-reflection method is like auto-ethnography and self-reflexivity. The auto-ethnography (Spry, 2001) (Russell, 1998) focuses on the performing self of the researcher in the given context. It is in congruence with the individual subjectivity concerning a broader perspective. As part of the Self-reflection method, the researcher needs to simulate and evaluate the usefulness, completeness and effectiveness of the CraftChange Knowledge Framework.

4.5.3 Reverse Case Study Mapping

The Reverse Cases Study Mapping method is like the 'Retrospective' method (Blaikie, 2002). As part of the Reverse Cases Study Mapping method, there is a need to map the findings from the practice to the Knowledge Framework based on the theory to identify the gaps, if any. This method helps to get close to the real-life example and practice during the initial phases of validation. It is like pattern discovery, where one knows the patterns and tries to find out its presence in the existing case studies or examples.

It is supposed to be a quick and effective method to validate the framework for its applicability in practice.

4.5.4 Practitioner Interviews

Practitioner Interviews around the framework to understand how they find the framework useful for the type of work they are doing. The focus of this practitioner interview is to find out the usefulness and completeness of the framework through their real-life situations and case studies. The critical differentiator of this method is that the people who have earlier lived the working experience are now accessing the new framework and trying to relive that experience. This helps to find out the gaps if any, in the framework and methodology



4.5.5 Formative and Summative Assessment

How useful and effective is the CraftChange Framework as integrated actionable

guidance for Service Designers in projects concerning sustained behaviour change?

Assessment is *'justifying the judgement against the stated goals and criteria'* (Taras, 2005). The assessment process is the procedure or means to catalyse a judgement which cannot be done in isolation. It requires criteria in terms of standards and goals within any given context. All assessments require explicit or implicit parameters (Sadler, 1998). In this thesis, the assessment focus was on usefulness and effectiveness of CraftChange Framework.

Summative Assessment (SA) is the process of assessment of a judgement which encapsulates all the evidence up to a given point. This point is seen as a finality at the point of the judgement. A summative assessment can have various functions which do not impinge on the process. (Taras, 2005).

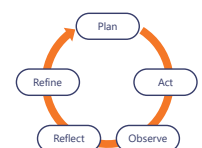
Formative Assessment (FA) is the process of assessment with a specific focus on feedback which indicates the existence of a 'gap' between the actual level of the work being assessed and the required standard. It also requires an indication of how the work can be improved to reach the required standard (Taras, 2005).

An assessment can be uniquely summative where the assessment stops at the judgement. However, it is not possible for an assessment to be uniquely formative without the summative judgement having preceded it, and hence planned for this research namely, the Summative assessment-1 -> Formative assessment-1-> Formative assessment-2 -> Formative assessment-3 -> Summative assessment-2.

4.5.6 Using Triangulation Methodology

Triangulation methodology help to gain a good understanding from different perspectives of an investigated phenomenon, in this case, CraftChange Framework. It is much more than just cross-checking data from at least two sources or methods to evaluate investigation output and outcomes. It is more to increase the level of knowledge about various elements under investigation, to strengthen the researcher's standpoint from various aspects; and to understand interconnections from various stakeholders' perspective.

The benefits of triangulation are *"increasing confidence in research data, creating innovative ways of understanding a phenomenon, revealing unique findings, challenging or integrating theories, and providing a clearer understanding of the problem"* (Thurmond, 2001, p. 254) It provides the required depth to the results generally not possible otherwise, thereby increasing the validity and utility of the findings. However, it can be time-consuming since collecting more data requires more significant planning and resources. Other disadvantages can be the *"possible disharmony based on investigator biases, conflicts because of theoretical*



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frameworks, and lack of understanding about why triangulation strategies were used” (Thurmond, 2001, p. 256). Overall, triangulation can be used to deepen the researchers’ understanding of the issues, to provide necessary research rigour and to strengthen confidence in the findings of qualitative studies.

There are several types of triangulation, such as data, investigator, theory, methodological, and environmental triangulation. Triangulation is useful in qualitative research. However, the researcher needs to consider its advantages and disadvantages before deciding to use it.

Data triangulation focuses on using different information sources in order to increase the validity of the research. It includes in-depth interviews with the relevant stakeholder groups to gain insight into their perspectives on research outcomes. During the analysis stage, stakeholder group feedback comparison may help to determine areas of agreement and divergence. Data triangulation is the most popular because it is easy to implement and can accommodate views of the different stakeholders that have vested interest in the research.

As discussed in Chapter 5 (Development of Knowledge Framework) and Chapter 6 (Development of Actionable Framework), CraftChange accommodated the views of various stakeholders like Service Design practitioners, Service Design researchers, Behaviour Scientists, service users and practitioners working in social impact initiatives.

Investigator Triangulation involves different investigators in the data collection and analysis process with the same qualitative method such as interview, observation, case study, or focus groups. The comparison of findings from each investigator would help to develop a broader and more in-depth understanding of different perspectives. The concurrence of different evaluators boosts confidence in the findings. As part of the protocol, all investigators refer to the same observation check sheet. It is an effective method of establishing validity but has challenges to assemble different investigators, manage their time and plan study in a given timeframe.

As discussed in Chapter 5 (Development of Knowledge Framework) and Chapter 6 (Development of Actionable Framework), as part of CraftChange formative workshop (no – three) and Summative workshop (no – two), two different evaluators were appointed apart from this researcher to observe and provide the overall feedback.

Theory triangulation means interpreting a single set of data involving investigators from outside of a field of study, unlike investigator triangulation. This triangulation theory suggests that investigators from different disciplines or positions bring diverse perspectives of the same information and their congruence can help establish the validity.



As discussed in Chapter 5 (Development of Knowledge Framework) and Chapter 6 (Development of Actionable Framework), CraftChange invited feedback on the conceptual framework and CraftChange – cards from Service Design researchers and Behaviour Scientists to understand diverse perspectives to establish the validity of CraftChange artefacts.

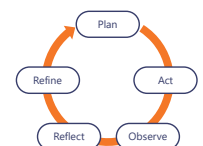
Methodological triangulation involves the use of various qualitative and quantitative methods during the investigation. The comparison for similarities of results from methods such as, surveys, focus groups, and interviews are indicative of the degree of validity of results.

The conceptual framework, i.e. CraftChange – Behaviour Change Progression Model, is formed based on theories and past research. It provides the theoretical grounding for the conceptual framework. However, empirical testing method, i.e. ‘Expert opinion’ tests the conceptual framework for consistency with reality. Chapter 6 (Development of Actionable Framework) assessment section provides further details. As part of this section, the ‘Expert opinion’ was taken to evaluate the usefulness and completeness of CraftChange conceptual framework from people working in the social sector and who have been engaged in making behaviour change on the ground for last few years. For methodological triangulation, this researcher took the existing Service Design Case study, which involved behaviour change and tried to map to the Conceptual model in retrospect to evaluate the completeness and usefulness as explained in Chapter 6 (Development of Actionable Framework) assessment section.

As part of Methodological triangulation, CraftChange – complete framework was evaluated for usefulness and completeness by collecting the data using various methods like practitioner interviews, observations and participant survey during formative and summative workshops, opinion of Service Design experts and feedback from practitioners after use of CraftChange Framework. Chapter 6 (Development of Actionable Framework) elaborates it in detail. The formative and summative workshops observations (with full instructions; with minimal instructions), participant feedback and expert opinion helped to refine and evaluate the framework in an iterative manner using ‘Plan-Act-Observe-Reflect-Refine’ cycles.

Environmental Triangulation involves the use of different locations, settings, and other critical factors such as the time, day, or season related to the environment in which the investigation took place. The degree of consistency of findings across these conditions establishes the validity of the research.

CraftChange Framework was evaluated at two locations across the continent, i.e. Pune (India) and Milan (Italy) in two different settings, i.e. Business organisation (TCS) and Academic institution (Politecnico di Milano, Italy). This environmental



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triangulation helped to establish that CraftChange has broader applicability in different contexts

4.6 Chapter Conclusion

This Chapter has outlined and discussed a contextual literature review done to examine design research methodologies relevant to the identified problem space in Chapter 1. The proposed investigation included not only theoretical viewpoints but various methodologies, methods and design practices. The investigation was inclined towards outlining a real-life based and natural way of doing Service Design that would help to maintain focus on actionable guidance for Service Designers. In keeping this spirit in mind, this thesis has considered an iterative research methodology inspired mainly from constructionist, interpretive and practice-led action research methodology. Action research principles were at the heart of conceptualising, designing, developing and evaluating the CraftChange Service Design Framework through multiple '*Plan-Act-Observe-Reflect-Refine*' cycles. The next Chapters elaborate the iterative conceptualisation of the CraftChange Framework.

5 Development of the CraftChange Knowledge Framework

This section elaborates the development journey of an integrative knowledge framework (KF) for Service Design for behaviour change. As explained in Chapter 2 (Overview of Service Design and Behaviour Change), Services are distinct than products due to their characteristics (Taura & Nagai, 2009) such as:

- variability
- simultaneity
- perishability
- inseparability
- intangibility

These service characteristics get reflected through Service Design, which has its distinctive features such as “*value co-creation, temporality, lifetime engagement, granularity, extensibility, evolvability, linkages and relationship*” (Pralhad & Ramaswamy, 2004). The Service Design process which addresses these characteristics needs to have:

- holistic approach
- multiple stakeholder involvement
- contextual data collection
- visual evidencing
- goal flexibility
- co-creation
- iterative validation

These Service Design perspectives were criteria for shortlisting the behaviour change models, frameworks. As discussed in Chapter 2 (Overview of Service Design and Behaviour Change) and Chapter 3 (Research Gap Analysis) maintaining the new behaviours for a long time is not easy, even considering simple cases such as:

- brushing the teeth twice a day
- turning off lights when not required
- switching off the air conditioner when not needed
- waste segregation
- de-addiction
- social sustainable behaviour

Examples from such a broad canvas of everyday experiences show that embracing and especially maintaining these behaviours for a long time is not easy. It is very critical to know what makes people and organisations behave as they do. People behave in an unmindful manner with the physical world around them because of their abilities, understanding and perception of the surrounding ecosystem, and their perceptions of themselves. Decades of research in multiple disciplines and practitioners have produced many useful behavioural insights. These insights are available in terms of various models, frameworks and principles regarding how people behave and what influences people behaviour. These behaviour change theories are the ‘active ingredients’ that are necessary to enable intended behaviour change, considering a specific target population, current behaviour and context (Michie & Johnston, 2012). Some researchers have identified the following three crucial steps to influence change effectively (Kok et al., 2015):

1. target a specific factor that influences the current behaviour
2. identify the elements that can be changed
3. make design interventions that work for the identified population, within the given social and physical environment contexts

This thesis summarises these learnings in the form of the CraftChange behaviour Change framework to make it easier to understand and apply during the Service Design life cycle. Individual and collective (group) perception about surroundings and perceived values are different. Hence, the same interventions may not work for an individual as well as group behaviour change. This thesis focuses on individual behaviour change only. The group behaviour change is part of the future scope.

The framework is envisaged as three-layered architecture, as shown in Figure 11. The top layer, i.e. ‘Knowledge Integration Layer’ plug-in and integrate the multi-disciplinary knowledge from various disciplines along with the provision to accommodate the other knowledge areas in future. The ‘Knowledge Integration Layer’ interacts with the Process Layer and influences the process steps, sequence and content for the in-process artefacts. The ‘Artefacts Integration Layer’ helps to integrate the various in-process artefacts.

5.1 Foundation of Knowledge Framework

This Chapter derives relevant snippets from the researcher's published paper (Behaviour Progression Framework for Designing Sustained Behaviour Change, 2018) which explained the development of the knowledge framework. This full paper is available under the Appendix section (Appendix No - 8).

The contextual literature review (Chapter 3 – Design and Behaviour Change) has explored the current approaches to design for behaviour change. It provides a broad cross-sectional overview from the social and behavioural sciences and how these have informed relevant Service Design approaches. Several disciplines are involved with human behaviour and behavioural change. Also, behavioural change interventions will occur at various levels – products, services, and will move up to the public policy. Through the literature review, extracted behavioural principles, guidance, strategies and patterns from behavioural theories and models. Similarly, design principles, guidance, strategies and patterns were also extracted for Service Design and allied fields. Special attention was given to the role of technology and service-scape in effecting behavioural change. This review provides a summary and critique to resolve overlap, redundancies and inconsistencies in the literature and proposes the Behaviour Change Progression Model. As a result, several theories and models have been proposed to guide the interventions, and they can be categorised in multiple ways. One of the ways is to categorise them depending upon their disciplines. An illustrative list of theories and approaches that have been used to guide the interventions (Mahamuni, Khambete, & Mokashi-Punekar, 2018):

- Disciplinary orientation: Psychology

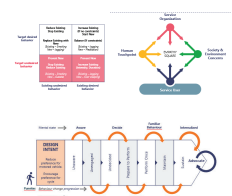
Learning, knowledge absorption, processing and retention; relations between attitudes, behavioural intentions and behaviours; behavioural changes over time and the attributes of the changed states (Learning Theories (Simandan, 2013), Theory of Planned Behaviour (Ajzen, 1991), Theories of Reasoned Action (Madden, Ellen, & Ajzen, 1992), Social Cognitive Theory (Bandura, 1986), (Prochaska & Velicer, 1997))

- Disciplinary orientation: Psychology or Persuasive design using technology

Role of Motivation, Ability, and Triggers in shaping behaviours, types of behaviour targets and appropriate interventions (Fogg, 2009), (Fogg & Hreha, 2010)

- Disciplinary orientation: Sociology

The role of society and social processes in influencing behaviours and



behaviour change; concerned with individuals and groups (Granovetter, 1978), (Rogers, 2003)

- Disciplinary orientation: Cognitive Psychology

Role of beliefs, practices, norms, knowledge, and other such factors, along with their inter-relations in influencing behaviours (Rosenstock, 1974), (Reckwitz, 2002)

- Disciplinary orientation: Behavioural Economics

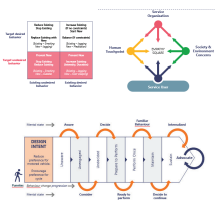
Nudge (Leonard, 2008), Choice Architecture (Thaler & Sunstein, 2008), System 1 and System 2 thinking (Kahneman, Thinking, fast and slow, 2011):

- Disciplinary orientation: Multidisciplinary

Behaviour influence and change frameworks that synthesise several theories to guide micro and macro design interventions ('4 E's' model (HM GOVERNMENT, 2005), (DEFRA, 2008) Behaviour Change Wheel (Michie, Stralen, & West, 2011)), MINDSPACE (Dolan, Hallsworth, Halpern, King, & Vlaev, 2010), C-R-E-A-T-E Action Funnel (Wendel, 2013), Design with Intent (Lockton, 2013).

The list is indicative but still overwhelming for the designers. The contextual literature review was not meant to be comprehensive; instead, it sought to offer a useful and robust framework for designing services imparting a behavioural change. As part of this approach, build on the outcomes of the systematic efforts put by various institutes and researchers. The following criteria have been used to short-list the theories and models under consideration.

- Fundamental theories and models of behaviour change from the social and behavioural sciences as identified as part of a project funded by the Arts and Humanities Research Council under the 'Design in Innovation' call, 2013 (Niedderer, 2014).
- Theories which are contributed significantly to the development of four or more theories as listed in the book titled 'ABC of Behaviour Change theories' by Susan Michie et al. (Michie, 2014)
- Behavioural wheel developed from triangulating literature and interview data (Michie, Stralen, & West, 2011)
- Design with Intent Toolkit (Lockton, 2013) draws upon different theories to



outline a collection of multiple tools and techniques that enable, motivate or constrain the user to encourage desired actions.

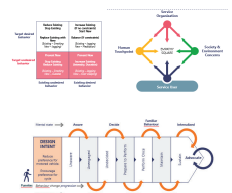
- Behaviour change design toolkits (Bridgeable, 2017)
- Darnton's (2008) review of 60 social-psychological models of behaviour and theories of change.

All these models and framework could be categorised as:

- approaches to understanding individual behaviour and context
- determining types of behaviour
- the process of behaviour change
- the steps individuals may take before taking actions

There are a few models which have focused on guidance for behaviour change. The available knowledge about behaviour change and design for behaviour change is very comprehensive but lacks coherence and actionable guidance. It is overwhelming for designers to grasp and start applying them to the practical problem-solving and imparting sustained behaviour change. The IDEAS framework (Mummah, Robinson, King, Gardner, & Sutton, 2016) has similar intent, but does not focus on sustained behaviour change and mostly provides process guidance. It is also observed that the IDEAS framework takes into consideration the service user perspective only, and there is no explicit mention of other stakeholders' perspective.

Theories and models which have a close affinity from a Service Design perspective were shortlisted further to address these challenges. For instance, the Stages of Change model (SoC) which is also known as the Transtheoretical Model (TTM) (Prochaska & Velicer, 1997) and the Precaution Adoption Process (Weinstein, 1988) explain how behaviour change happens at individual or group level. It was then overlaid with the behaviour wizard (Fogg & Hreha, 2010) for various behaviour intentions along with dot, span, path changes. The models and frameworks which indicate intervention guidance were divided into who (addresses intervention strategy), what (intervention design) and (how) intervention execution to reduce the confusion and provide clarity to the Service Designers. It was found that few models like Michie's wheel (Michie, Stralen, & West, 2011) were operating at multiple levels, and it is difficult to segregate them. It helped to map the existing body of knowledge into different intervention layers. Hence it was kept open for contextual interpretation.



The CraftChange Knowledge Framework provides an approach to meet a specific behaviour change intention through a set of design interventions. An Intervention strategy for each cell will guide the designer in what to do in that phase to achieve the intended behaviour change. Models or frameworks like Michie’s wheel (Michie, Stralen, & West, 2011) fall into this category. It is now when this high-level strategy gets closer to realisation with the intervention design. While designing interventions, the Service Designer needs to understand and cater to how the user acts. The C-R-E-A-T-E model (Wendel, 2013) is handy here which tries to encourage a conscious choice or an intuitive response. The primary purpose of considering this model while designing the interventions is to understand the various leverage points, which provide users with opportunities to continue by providing more effective or better than the known alternatives. Intervention guidance layers of the Behaviour Change Progression Model will help designers to realise this sustained behaviour change progressively with a checkpoint at each stage.

Henceforth the CraftChange Knowledge Framework versions are referred to as KF for convenience.

5.2 Iterative Conceptualization – KF0.1 to KF0.6

As identified in Chapter 3, the research gap highlights the lack of the intermediate knowledge layer between theory and practice. For bridging the gap between theory and practice, referred to bridging concepts (Dalsgaard & Dindler, 2014) while developing integrated actionable guidance of behaviour change principles, models and frameworks from various disciplines.

While bridging these concepts, the focus on the Service Design life cycle was at the centre. These bridging concepts were embedded in the Service Design life cycle because it is intended for Service Designers, who are facilitating the progression towards sustained behaviour change for the greater good. Figure 17 and Figure 18 are inspired by the (Between theory and practice: bridging concepts in HCI research, 2014).

	Conceptual constructs	Strong concepts	Bridging concepts
Primary origins	Theory	Design Cases	Inspired by exemplars as well as theory
Primary intent	Theoretical advancements	Informing design practice	Facilitating exchange between theory and practice

↑
CraftChange Framework to Support

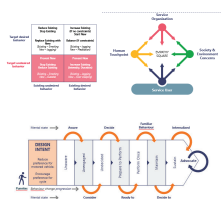


Figure 17: Bridging Concepts For CraftChange

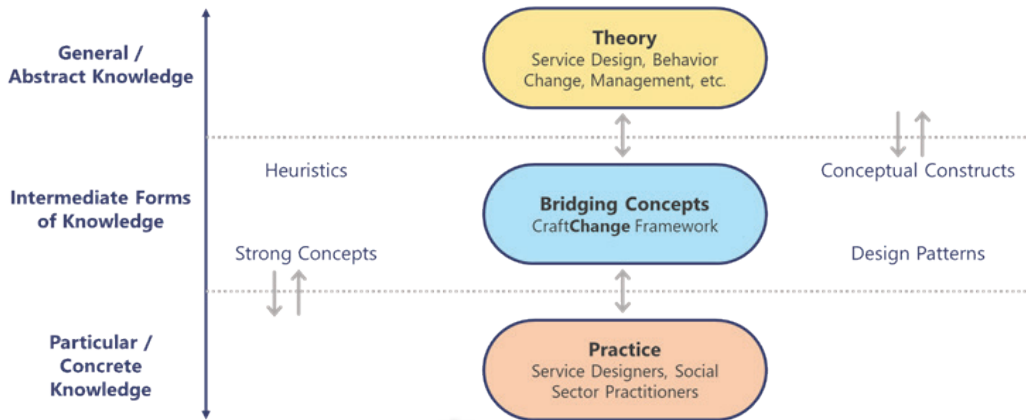


Figure 18: CraftChange Framework As Bridging Concept

As shown in Figure 18, the CraftChange Framework is proposed as the bridging concept to bridge the Service Design, behaviour change knowledge and Service Design practices. The CraftChange Framework as a bridging concept planned to provide actionable guidance to the Service Designers.

The CraftChange - Behaviour Change Progression Model as shown in Figure 19, adopted concepts from the Precaution Adoption Process, Transtheoretical Model - Stages of Change, CREATE Action Funnel - Stephen Wendel, Behaviour Change Wheel - Susan Michie and Behavior Wizard Fogg and Hreha.

Changing behaviour is primarily a choreographed systematic plan that follows a logical sequence of interconnected stages. This plan gets executed through the designed interventions whose intention is “to get an individual or a population to

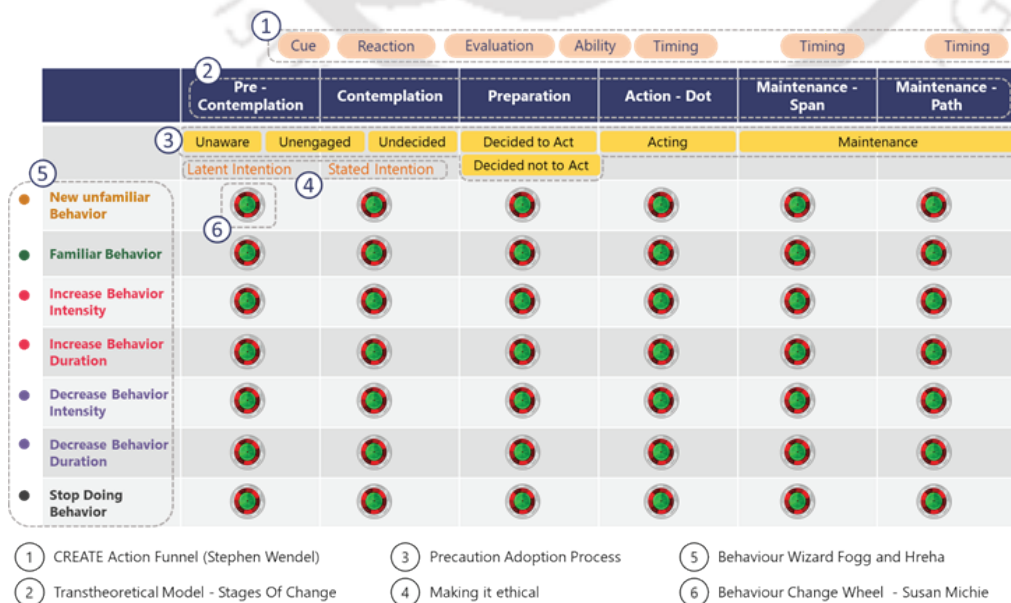


Figure 19: CraftChange Knowledge Framework Vo.1

behave differently from how s/he or they would have acted without such an action” (Michie et al., 2014).

Generally, interventions aimed to influence behaviour are inspired from the relevant theoretical knowledge, existing interventions and practice. Theoretical knowledge is typically drawn from the behavioural sciences and associated fields (House of Lords, 2011).

The design intentions (latent or stated) can be listed as an introduction of new, unfamiliar behaviour, an introduction of new familiar behaviour, reduction of existing behaviour duration, reduction of existing behaviour intensity, increase in existing behaviour duration, increase in existing behaviour intensity and stopping the behaviour (Fogg & Hreha, 2010). The shared resources such as time available, energy, effort and social support pose constraints for individuals undergoing behavioural change. Due to the individual’s constraints, a designer needs to ‘balance’ multiple behaviours or sometimes ‘replace’ an existing behaviour. For example, if parents want their children to spend more time in their studies, but want them to be healthy too, the free time available and energy become constraints. Children need to strike a balance between studies and sports considering these constraints. While introducing a new behaviour, one might be replacing the existing behaviour because even doing ‘nothing’ is an existing behaviour.

Suppose one wants to introduce a morning jogging behaviour where the existing behaviour might be being lazy to come out of the bed and keep checking the smartphone. In this situation, one needs to design interventions to replace this existing lazy behaviour with new ‘jogging’ behaviour. As shown in Figure 20, the

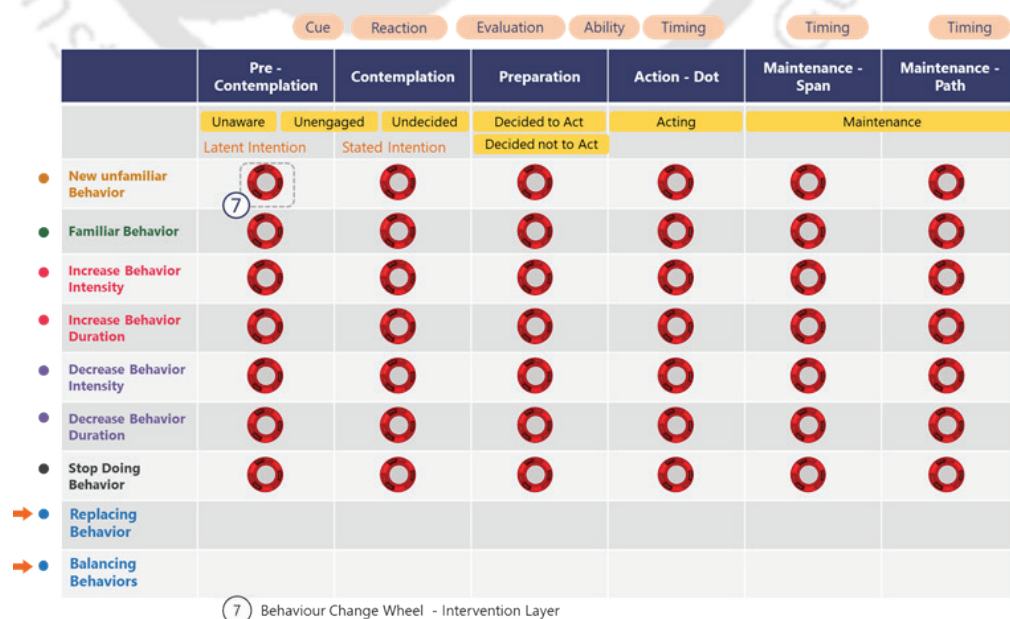


Figure 20: CraftChange Knowledge Framework Vo.2

Mental state change	Stages						
	Unaware	Unengaged	Undecided	Prepare to perform	Perform once	Maintenance	Sustain
★ Intention Stated/Latent							
● New unfamiliar Behavior	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Familiar Behavior	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Increase Behavior Intensity	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Increase Behavior Duration	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Decrease Behavior Intensity	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Decrease Behavior Duration	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
● Stop Doing Behavior	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
➔ Replacing Behavior	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design
➔ Balancing Behaviors	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design	Intervention strategy Intervention Design

Figure 21: CraftChange Knowledge Framework Vo.3

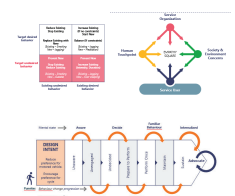
two new behaviours have been added as ‘Replacing Behaviour’ and ‘Balancing Behaviour’. This new version of the model considered only the ‘intervention layer’ from Susan Michie’s Behaviour Change Wheel.

In the process of simplification of the knowledge framework and integration of these multiple models, an attempt was made to cover all the behaviour progression stages such that they are closer to real-life situations.

Figure 21 shows a simplified, integrated version of different behaviour progression stages along with the mental state at the end of each stage. Each cell corresponds to the stage and intent of the behaviour change, that is needed to guide the designers. It provides actionable guidance during intervention design. It has ‘intervention strategy’ and ‘intervention design’ guidance, as shown in Figure 21.

While integrating the aspects of the ethical concerns, as explained in section 2.6 and 5.2.1; and as part of the research question - to address considerations ‘for the common good’, - the knowledge framework considered concerns of multiple stakeholders. As behaviour gets reflected through action, the CREATE Action Funnel - Stephen Wendel (2013) in the model was integrated into the Knowledge Framework, as shown in Figure 22.

In an endeavour to integrate the CREATE Action Funnel (Wendel, 2013), the intervention types were abstracted out into the three layers - 1. strategy to decide what to design and why; 2. design guidance and 3. execution guidance, as shown in Figure 23.



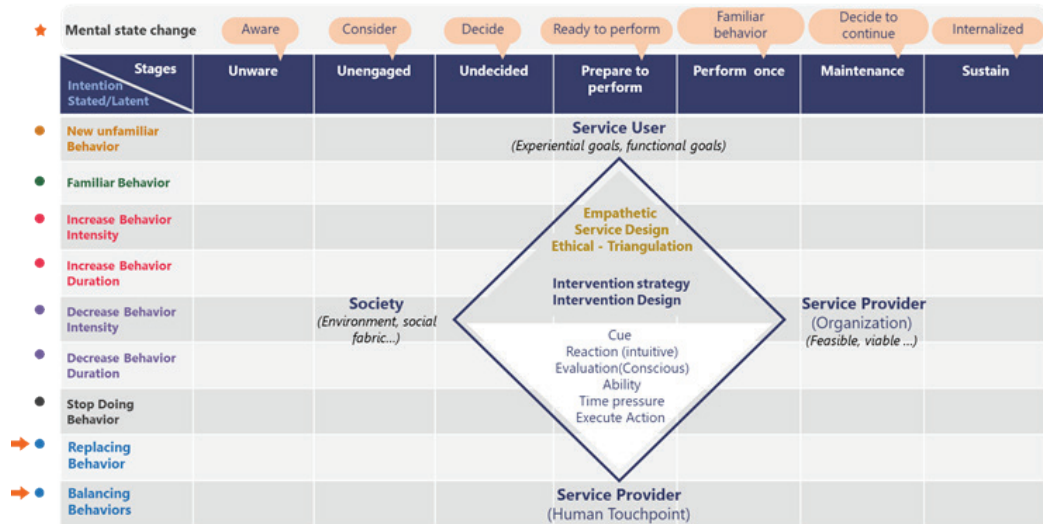


Figure 22: CraftChange Knowledge Framework Vo.4

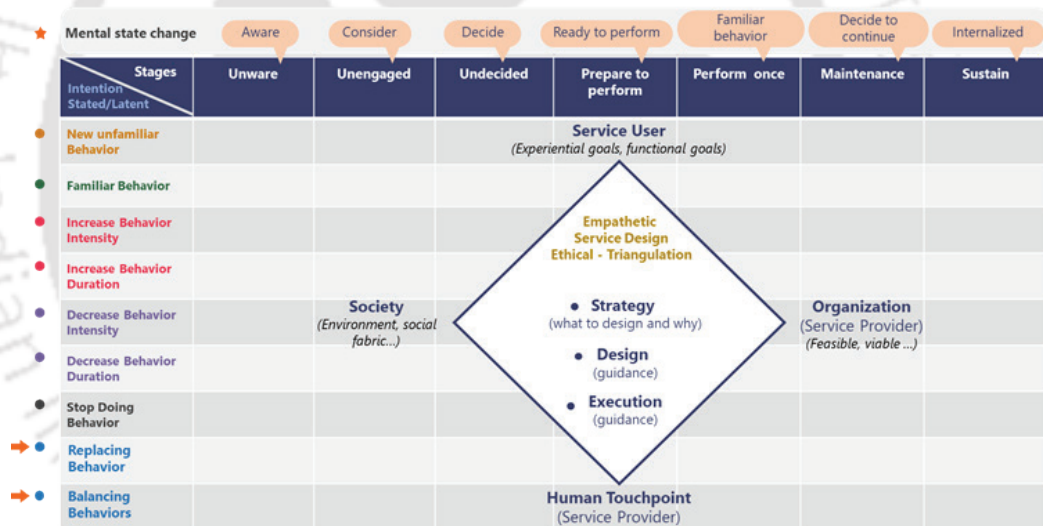
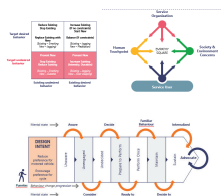


Figure 23: CraftChange Knowledge Framework Vo.5

The knowledge framework adopts concepts from the Precaution Adoption Process (Weinstein, 1988), Transtheoretical Model - Stages of Change (Prochaska & Velicer, 1997), CREATE Action Funnel (Wendel, 2013), Behaviour Change Wheel - Susan Michie (Michie, 2014) and Behaviour Wizard (Fogg & Hreha, 2010). The synthesis of behaviour change principles, models and framework are distributed in such a seamless manner that behaviour change progression for sustained behaviour change is mainly captured in the progression model; holistic-ness is captured through Empathy Square, and intentions are captured through the Intervention Matrix as shown in Figure 23.



From this integration, the following three components emerged as part of the CraftChange Knowledge Framework:

1. Four stakeholders' concerns called as '*Empathy Square*' as explained in 5.2.1
2. Design guidance through '*Intervention Matrix*' as explained in 5.2.2
3. '*Behaviour Change Progression Model*' as explained in 5.2.3

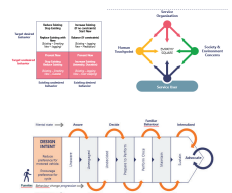
These three components of the knowledge framework are explained in detail in the following sections.

5.2.1 Empathy Square

Service Design interventions aiming to change human behaviour inevitably raises ethical concerns. Richard Thaler's work on decision making helps us to understand how behaviour influences ethics and how to approach design interventions that help to nudge people towards more ethical behaviour (Thaler & Ganser, 2015).

Induced behavioural change often poses an ethical dilemma for designers because there is no universal truth about what is ethical and what is not. Instead, an ethical approach is considered as the act of making conscious and deliberate decisions addressing concerns of all stakeholders in a context (Acaroglu, 2019). It becomes challenging for Service Designers to select the consequential ethics approach, i.e. maximise the best outcome for the most people, or the deontological ethics approach, i.e. do the right thing using whatever is the current 'rightness' (Acaroglu, 2019). Considering the subjectivity associated with the ethical dimensions of human behaviour, it becomes challenging for Service Designers to bring together both ethical approaches to initiate and facilitate design interventions.

Though influencing people's behaviours is not new, designers need to take care of ethical concerns, and one of the ways is to make sure that the interests and concerns of all stakeholders are appropriated. The CraftChange Empathy Square aims to encourage the use of behaviour design that helps create meaningful change in people's lives by fulfilling a relational obligation they all may have in common. Empathy Square indicates that in the designing of services, the Service Designer needs to be empathetic to the concerns of all the major stakeholders involved, namely, the Service user, service provider, human touchpoints and society and environment. (Mahamuni, Meroni, Mokashi-Punekar, & Khambete, 2019) (Mahamuni, Khambete, & Mokashi-Punekar, Behaviour Progression Framework for Designing Sustained Behaviour Change, 2018).

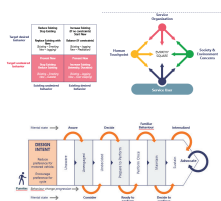


There are similar examples, which emphasise on the role of Service Design for solving sustainability problems by unlocking value for each stakeholder in a value chain. Among the various stakeholders, service staff, i.e. human touchpoints, are generally getting less or no attention, which may be detrimental for sustainability. On one side, service staff plays a crucial role in helping service users to encourage, engage, perform and maintain the behaviours towards sustainability. On the other side, their needs are very often neglected, as the staff was not part of a wellbeing equation that is not only crucial for social sustainability but the overall quality of the service too (Meroni & Sangiorgi, 2011). It is the prima facie responsibility of the service organisations to take care of the social and financial wellbeing of their service staff.

Through multiple Service Design for sustainability projects (Prendeville & Bocken, 2017) (Matthing, 2017) it is evident that the Service Design solution needs to be empathetic to the concerns of a service user, service organisation, human touchpoints and most importantly society and environment. To achieve this and arrive at a balanced and ethically appropriate Service Design solution for any problems, Empathy Square (Mahamuni, Khambete, & Mokashi-Punekar, 2019) as shown in Figure 24 seems useful. It can enable designers, all along the design process, to focus on the eco-systemic approach, to maintain the delicate balance between the concerns of the service-user, human-touchpoints (service staff), service organisation and the society or environment. During 1970s Victor Papanek, first asserted that *“Design, if it is to be ecologically responsible and socially responsive, must be revolutionary and radical”* (Papanek, 1970).

Service Design interventions aiming to change human behaviour may interfere with people’s lives, and this is bound to have ethical concerns. Changing people’s behaviour is nothing new. The commercial advertisements through various channels, campaigns by non-government organisations and government regulations influence everybody’s behaviour all along, whether one wants it or not. One rarely thinks of these interferences as being wrong or intruding in their lives. However, as a designer, one needs to make sure that ethical concerns are taken care of, and one of the ways is to make sure that interests of all stakeholders’ individual as well as at group level needs are considered. Empathy Square tries to congruence empathy from a designer’s perspective and the benefits of various stakeholders to address ethical concerns more pragmatically.

Empathy Square indicates that while designing services, the Service Designer needs to be empathetic to the concerns of all these main stakeholders, i.e. the Service user, service provider, human touchpoints and society and the environment. Since the interests of multiple stakeholders need to be addressed, there is a need to balance these interests. Empathy Square will be first anchored with the node most significant for the given design brief and then move to the remaining three nodes. The visualisation of the square balancing on one node is to indicate the same. It is



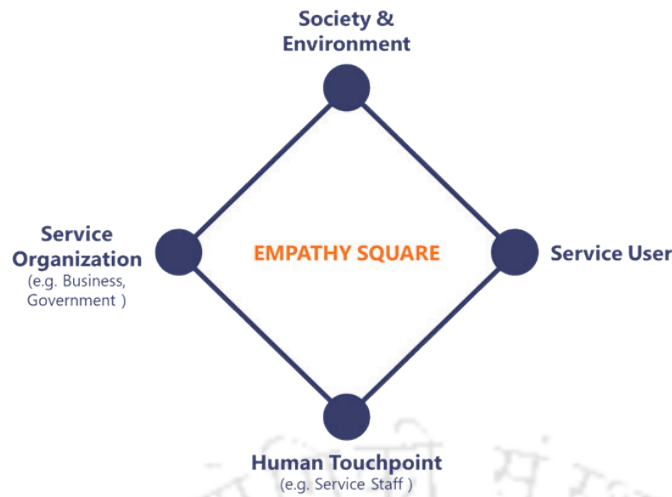


Figure 24: CraftChange Knowledge Framework Vo.5 - Empathy Square

called a *square* because of the four nodes, giving equal importance to all nodes and because, generally a ‘*Square*’ is an open space where people can meet and engage in exchanges, for example, as in a ‘*city square*’. Interestingly, the adjective ‘*Square*’ also means fair and honest, and the verb ‘*Square*’ means to make compatible or reconcile.

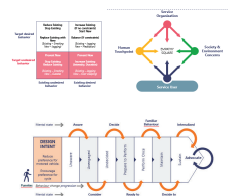
The Empathy Square as shown in Figure 24, requires the design team to explicitly articulate and match, not only the concerns of the service provider and service user but also those of the human touchpoints (the staff), and the society and environments, as entities that have the rights to be ‘served’ and fulfilled in order to achieve sustainability.

Section 6.4 explains Empathy Square in the domain of sustainability through examples such as online retail stores, electric cars.

5.2.1.1 Reverse Case Study Mapping method for ‘Pune Cycle Plan’ - Reflect

The following observations were recorded regarding the representation of the Empathy Square during an assessment of the CraftChange Knowledge Framework through the ‘Reverse Case Study Mapping’ method. These observations were made in the context of the Pune Cycle Plan, as explained in section 6.1.1.

- Empathy Square does not provide any indication from where to start
- It is confusing to understand the sequence of nodes to follow
- Current representation gives the impression that nodes need to be



addressed sequentially

5.2.1.2 Reverse Case Study Mapping' method for Pune Cycle Plan - Refine

After reflecting on the feedback, it was decided to modify the visual representation to address the reflections listed in section 5.2.1.1.

The Empathy Square diagram was improved to start from a specific node of the Empathy Square. This ensured that it indicated a predefined sequence. Designers may start with any node that requires immediate attention. As shown in Figure 25, this node can act as an anchor for the other three nodes. If it is a sustainability initiative, then designers may start from the society and environment node and sequentially move to the other nodes (refer Figure 25). For an employee wellbeing initiative, the designer can start with the human-touchpoint node and then balance the concerns within other nodes (refer Figure 26). It is essential to be empathetic to the concerns of all four nodes while designing the services to sustain them for a more extended period. Empathy Square was used in multiple projects in the social and business sector, and found to be promising. It gets operationalised by addressing concerns with an anchor node and then taking care of concerns of the other three nodes.

Service Design, due to its holistic and long temporal nature, is the desired approach where sustainability concerns are to be addressed sustainably. People’s sustained behaviour plays a crucial role in sustainability endeavours. If Service Design takes care of sustainability concerns by designing for sustained responsible behaviour change, it will contribute to a long-lasting impact. Thus, business organisations can change the focus from CSR initiatives to make sustainable Service Design as a part of their core business strategy. Empathy Square reminds Service Designers to

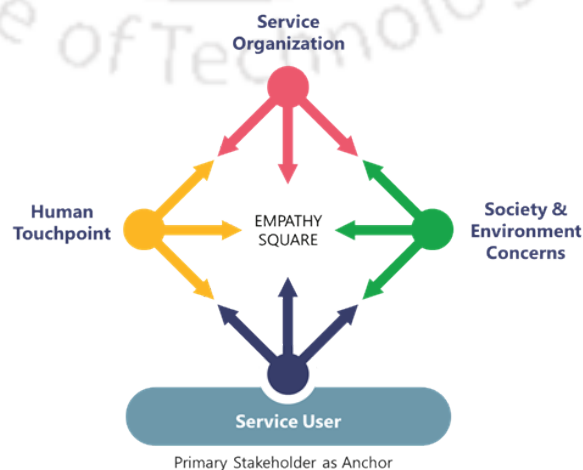


Figure 25: CraftChange Knowledge Framework vo.6 - Empathy Square

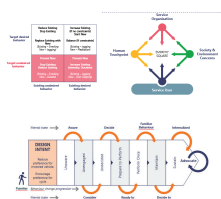




Figure 26: CraftChange Knowledge Framework vo.6 - Empathy Square

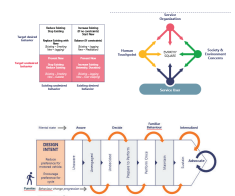
balance the concerns of multiple major stakeholders, interlinking Service Design, sustainability and sustained behaviour change.

With a drastic increase in awareness about sustainable actions among people, society and organisations, it is inevitable to address the concerns of all the four stakeholders consistently through actions, as part of their business. This shift from sustainability as a Corporate social responsibility (CSR) activity is becoming a crucial element of core business strategy. This congruence can expedite the process. We believe that this knowledge will be helpful while designing impactful design interventions, addressing sustainability concerns such as perspectives from the service user, society and environment, human touchpoints such as service staff and service organisations like governments or businesses. This Empathy Square comes handy to scrutinise the interventions from the perspective of four prime stakeholders. It is also a part of the proposed Behaviour Change Progression Model, which is explained in a subsequent section.

Empathy Square helps a designer to deal with the array of views and perspectives. It provides structure to position design interventions as ethical. The proposed design intervention may be a design sustainable not only for the individual service user but for the larger society and for future generations. The Empathy Square attempts to balance the needs and aspirations of four stakeholders. Due to its micro to macro-level impact, influencing behaviour change has received much attention from policymakers and practitioners from a range of domains.

5.2.2 CraftChange – Intervention Matrix

The current behaviour is presently observable action that is specific concerning time, place, quantity, duration and frequency, and can be measured. The target behaviour is similar, but expected behaviour is directly connected to future outcome



or goal mentioned in the design brief. Often the behaviour is called a ‘*practice*’, and when maintained for an adequately long time, it turns into a ‘*habit*’. The target behaviour must be precise, actionable, measurable, observable, and most importantly, feasible (Advanced Workshop on Designing for Behavior Change: Focus on Activities, 2017). Intervention Matrix is conceptualised to identify the type of behaviour change and is motivated by a diagram with ‘*force*’ versus ‘*salience*’ indicating types of influence (Tromp, Hekkert, & Verbeek, 2011), three strategies concerning product design and user behaviour (Elias, Dekoninck, & Culley, 2007), and Behaviour Wizard (Fogg & Hreha, 2010). The Intervention Matrix gives high-level guidance depending upon the desirability of existing and target behaviour. We have taken the position that the ethically and socially responsible designer will resist design intervention that encourages undesired and unethical target behaviour. Thus, the proposed CraftChange Framework aimed to promote only the desired target behaviour while designing services for sustained behaviour change. As is evident from the Intervention Matrix, it is seen that when the state of the existing behaviour is undesirable, and the target is to transform it into the desired behaviour, it suggests the following three options namely, going for reducing the existing behaviour; stopping the existing behaviour, or eventually replacing the existing behaviour with the target behaviour. Similarly, when the existing, as well as the target behaviour, are desirable, then the Intervention Matrix suggests the following three options viz. increasing the existing behaviour if no constraints exist; introducing the new desired behaviour; and create a balance of both the desired behaviours since there are contextual constraints due to shared resources such as time, money, social support and others.

Intervention Matrix, as shown in Figure 27, helps to identify the type of behaviour change and is helpful while redefining the design brief in terms of behaviour change. It is inspired by Tromp et al.’s (2011) diagram, Elias et al. (2007) matrix and Behaviour Wizard Fogg and Hreha. Figure 27 represents the landscape of the various behavioural change possibilities. It was envisaged to help a designer to decide the

		Contextual Constraint - Shared resources e.g. Time, money, social support
New desired behavior	Reduce Existing Stop Existing Replace Existing with New <i>(Existing – Smoking New – Jogging)</i>	Increase Existing (If no constraints) Start New Balance (If constraints) <i>(Existing – Jogging New – Meditation)</i>
	New undesired behavior	Prevent New Stop Existing Reduce Existing <i>(Existing – Smoking New – Gutaka)</i>
	Existing undesired behavior	Existing desired behavior

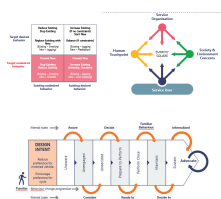


Figure 27: CraftChange Knowledge Framework v0.5 - Intervention Matrix

intervention quadrant and then get the guidance of intervention strategies for this intended behaviour change.

5.2.2.1 Reverse Case Study Mapping’ method for Pune Cycle Plan -

Reflect

During the assessment of the CraftChange Knowledge Framework through ‘Reverse Case Study Mapping’ method for the Pune Cycle Plan as explained in section 6.1.1, the following observations were recorded regarding the representation of the Intervention Matrix.

- ‘New Desired behaviour’ is confusing because the behaviour might not be ‘new’ always
- Considering all the aspects, it is generating too many options
- Does the framework need to support the unethical target behaviour? Can it be avoided or discouraged?

5.2.2.2 Reverse Case Study Mapping’ method for Pune Cycle Plan -

Refine

After reflecting on the feedback, appropriate modifications were made to the content and the visual representation to address the reflections mentioned in section 5.2.2.1.

The new version of the Intervention Matrix supports the target behaviour and discourages unethical, undesired target behaviour, as shown in Figure 28. Now the following are the possible behaviour change strategies available for designers:

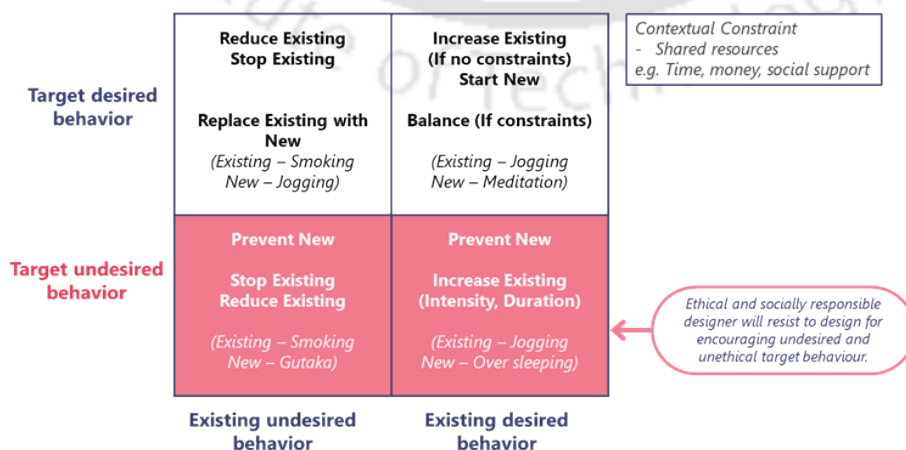
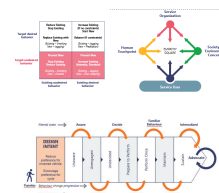


Figure 28: CraftChange Knowledge Framework vo.6 - Intervention Matrix



- Introduce Target behaviour
- Balance existing and Target behaviour
- Replace the existing behaviour
- Increase the existing behaviour
- Decrease the existing behaviour
- Stop the existing behaviour

5.2.3 CraftChange - Behaviour Change Progression Model

The Behaviour Change Progression Model is in a synthesised form while enabling progression. It depicts the integrated view with various intentions along with behaviour change stages to reach the internalisation state (refer Figure 29). The mental state shows what will help the user to move to the next state.

Figure 29 depicts an integrated view of the ethical perspectives of multiple stakeholders; various design intentions, along with behaviour change stages required to reach the internalisation state. The mental state shows what will help the user to move to the next state. (Mahamuni, Khambete, & Mokashi-Punekar, Behaviour Progression Framework for Designing Sustained Behaviour Change, 2018). The CraftChange Behaviour Progression model, which is a conceptual model indicates that for design intents such as start new behaviour or reduce/stop/balance /replace current behaviour, a designer needs to come up with interventions for each depicted behaviour change state for every service user.

A service user might not be aware of how to accomplish the intent, and hence the designer needs to come up with interventions so that the user becomes aware of them. Once the user is aware, the design interventions need to keep the service user

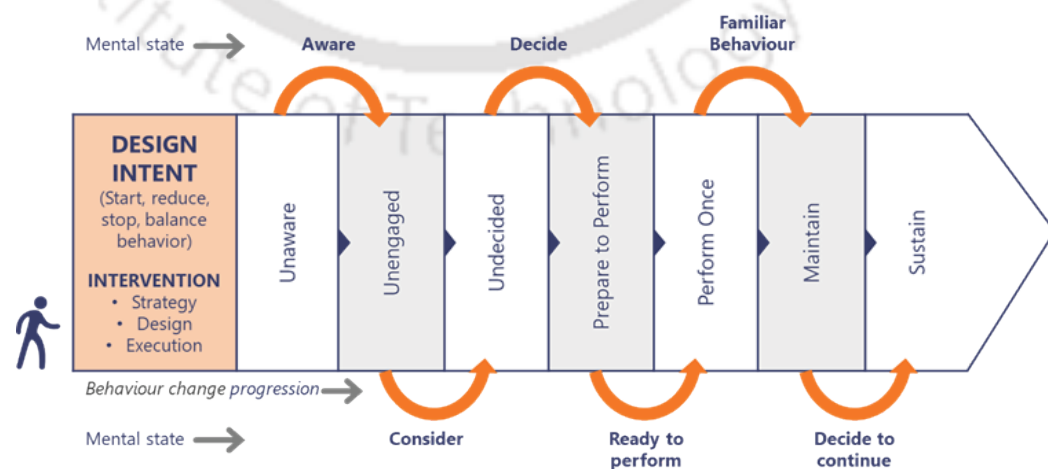
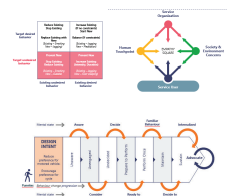


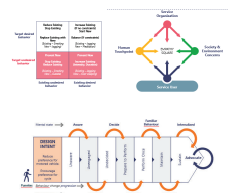
Figure 29: CraftChange Knowledge Framework Vo.5 - Behaviour Change Progression Model



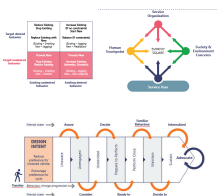
engaged so that they can start actively considering the intent. A designer can design interventions which can help the service user to decide to perform the intended action. Once the service user decides to act, the designed interventions can enable this action by providing all necessary help and reducing the entry barrier. After the service user acts once, designed interventions can motivate the service user to continue for some time and then to sustain it for a longer time. If the service user performs the intended action for a long time, then it gets internalised. Designers can also enable the service user to become an advocate so that it can encourage others also to do the intended actions.

Following are the Elements of the Behaviour Change Progression Model:

- **Behaviour Change Progression** – The progressive behavioural stages of an individual to be considered while designing interventions for sustained behaviour change.
- **Design Intent** – The intention of an activity guiding Design for Behaviour Change (for example, start, reduce, stop or balance behaviour), i.e. Behaviour Change Intent.
- **Intervention Strategy** – This layer provides the strategy level guidance from existing knowledge on how to approach, what aspects need to be considered.
- **Intervention Design** – This layer provides the next level of guidance which can help to design interventions.
- **Intervention Execution** – The layer guides from an intervention execution perspective.
- **Unaware** – The stage of behavioural change that instructs design interventions to aid individuals to be aware of their existing behaviour.
- **Aware** – The mental state of being aware of the existing behaviour, new behaviour, and understanding the intent for behaviour change.
- **Unengaged** – The stage of behavioural change that instructs design interventions to engage individuals in activities to promote conscious consideration for a change of behaviour.
- **Consider** – The mental state of realising the opportunities and benefits of initiating activities for a change of behaviour, but not yet decided to act.



- **Undecided** – The stage of behavioural change that instructs design interventions to aid individuals to decide consciously to undergo a behaviour change activity.
- **Decide** – The mental state of decision making to perform appropriate actions for behaviour change.
- **Prepare to Perform** – The stage of behavioural change that instructs design interventions to proactively aid individuals and prepare their contextual environments to perform an activity for behaviour change.
- **Perform Once** – The stage of behavioural change that instructs design interventions to facilitate initiation of a behavioural change activity for the first time.
- **Ready to Perform** – The mental state of inculcating cognitive confidence while approaching to perform an activity for behaviour change.
- **Familiar Behaviour** – The mental state of recalling familiarity with a given behavioural activity that an individual achieves by performing it at least once.
- **Maintain** – The stage of behavioural change that instructs design interventions to facilitate continuation in the performance of an activity.
- **Decide to Continue** – The mental state of decision making to continue or repeat performance of an activity for sustained behaviour change.
- **Sustain** – The stage of behavioural change that instructs design interventions to prevent individuals from dropping out of the newly inculcated behaviour.
- **Internalised** – The mental state of inculcating a behaviour as part of one's natural self.



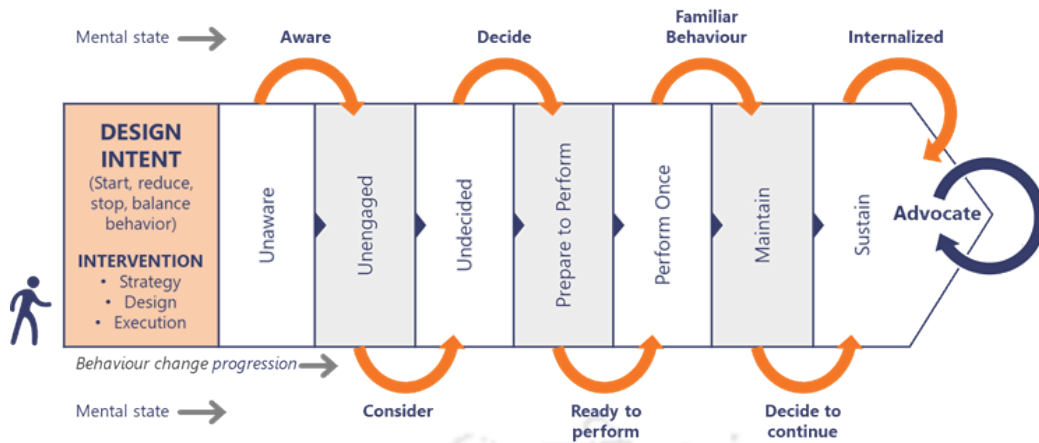


Figure 30: CraftChange Knowledge Framework Vo.6 - Behaviour Change Progression Model

5.2.3.1 Reverse Case Study Mapping’ method for Pune Cycle Plan - Reflect

During the assessment of CraftChange Knowledge Framework through the ‘Reverse Case Study Mapping’ method for the Pune Cycle Plan as explained in section 6.1.1, the following observations were recorded regarding the representation of the Behaviour Change Progression Model.

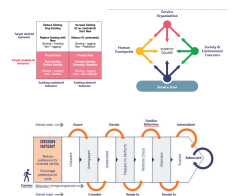
- The current model stops at the ‘*internalised*’ state as part of the ‘*sustain*’ stage.
- Need to showcase the people who promote the change or encourage others to do so
- Current representation is giving the sequential nature of nodes

5.2.3.2 Reverse Case Study Mapping’ method for the Pune Cycle Plan - Refine

After reflecting on the feedback, appropriate modifications were undertaken to the visual representation to address the reflections in section 5.2.3.1. The newly added state is about how can one encourage and enable people to become an advocate of change.

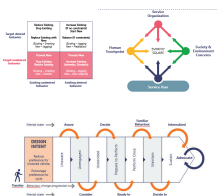
The designers need to ideate about such interventions that make people who sustained the behaviour for a long time to become an advocate of the change.

Advocate – The stage where a user starts advocating the behaviour change and motivates others.



5.3 Chapter Conclusion

This Chapter explained the 'Knowledge Framework' that forms one of the critical components of the CraftChange Framework. The right steps to integrate the behaviour change principles, models and frameworks in a proper manner so that it is useful and practical for Service Designers. This was decided through extensive literature review and practitioner knowledge. It followed the iterative conceptualisation methodology with 'Plan-Act-Observe-Reflect-Refine' cycles to come up with Empathy Square, Intervention Matrix and the Behaviour Change Progression Model. The researcher used self-reflection method for initial validation, and the next Chapter details the formative and summative studies for iterative assessment and refinement of the Knowledge Framework.



6 Assessment of CraftChange Knowledge Framework

The CraftChange Knowledge Framework is a conceptual framework that is formed based on theories and past investigation. As a hypothesis, it can be considered as the best possible framework based on an empirically validated theory (Agogué & Kazakçi, 2014), previous research and logical basis as explained during the CraftChange Knowledge Framework development process. As a next logical step, it needs to be tested for consistency with reality. This consistency check is explained in the following sections.

The CraftChange Knowledge Framework was evaluated through multiple methods. The researcher initially used self-reflection, which is like autoethnography and self-reflexivity, as explained in Chapter 4 – 4.5.2 section. Self-reflection helped to simulate and evaluate the usefulness, completeness and effectiveness of the CraftChange Knowledge Framework. This researcher's industry experience helped in the self-reflection to identify the gaps and refine them iteratively. The initial five versions were iteratively refined till the KF v0.5, which was then assessed using the Reverse Case Study Mapping method, as explained in Chapter 4 – 4.5.3 section. As part of the Reverse Case Study Mapping method, the researcher attempted to map the findings from practice to the Knowledge Framework based on the theory to identify the gaps, if any. After assessing the framework through Reverse Case Study Mapping, the refined framework was assessed through interviews with the social sector practitioners, as depicted in Figure 31.

The initial iterations and self-reflection are explained as part of the Development of the CraftChange Knowledge Framework section 5.2. This section focuses on the external assessment and two case studies depicting the CraftChange Knowledge Framework application in the social sector and the organisational domain.

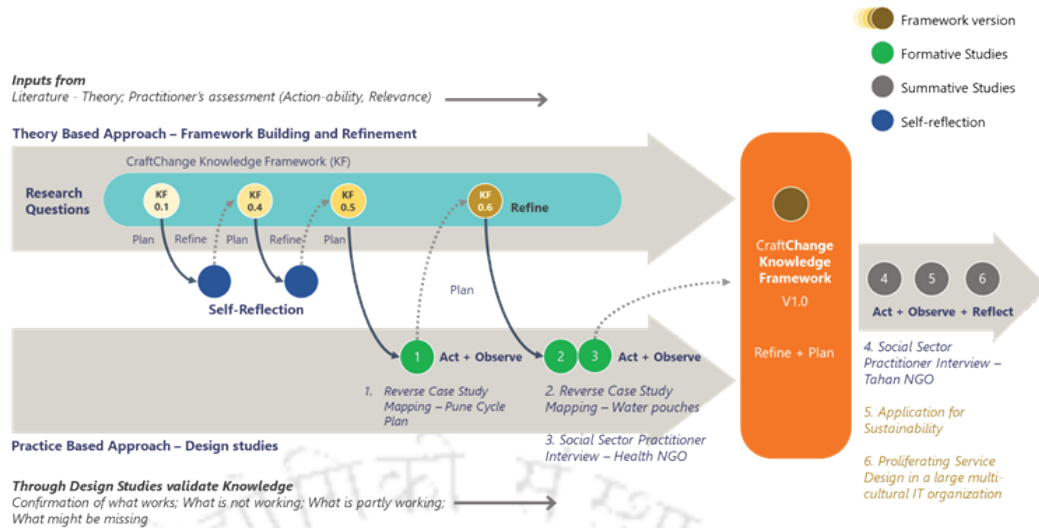


Figure 31: CraftChange Knowledge Framework Assessment Summary

6.1 Formative Studies

6.1.1 Reverse Case Study Mapping – Pune Cycling Plan

The Reverse Case Study Mapping method builds on previously learned information and applies the information to new content. It tries to identify the gap between practice and theory. It also helps to identify the gap between tacit and explicit knowledge (Nonaka, Takeuchi, & Umemoto, 1996). It promotes critical thinking, problem-solving and evaluating new concepts. Reverse case study mapping method has been used even to generate discussion and assist in thinking like other stakeholders. This method is demonstrated in various domains and contexts like healthcare, e.g. 'to think like a nurse.' (Beyer, 2011). It is a handy method for assessing a new way to represent information or new ways of doing things. This method helps to conceptually map the existing work to evaluate and check for completeness and correctness.

Coincidentally, while developing the CraftChange Knowledge Framework for sustained behaviour change, the initiative called 'Pune Cycle Plan' was in full swing at this researcher's hometown. The vision of this initiative was to 'make Pune a cycling-friendly city where cycling is safe, comfortable, convenient, attractive and enjoyable' with an objective to 'increase the modal share of cycling from the current 3% to 25%, by the year 2031' (PMC Pune, 2017). This initiative had a sustained behaviour change perspective facilitated by various interventions. Since this case study involved behaviour change, longitudinal view and multiple stakeholders, it was used to assess the CraftChange Knowledge Framework for its usefulness and completeness. Since it is a reverse case study mapping, 'Pune Cycle Plan' case study was looked through the lens of CraftChange, to assess it.



Pune was once well-known as a city of cycle enthusiasts, and old-timers still recall their cycling days in the 1950s to 1970s and thereafter. Then the cycle was the primary mode of commute for children and adults alike. Those days, mornings and evenings were buzzing with the sound of cycle bells of people going to work as well as vendors selling goods using cycles. Unlike today, safety on the roads was not much of concern due to very a smaller number of motorised vehicles on the road.

However, ‘*transportation*’ is now a major civic issue in most of the cities, including Pune. Facilities for walking, cycling, public transport have not kept pace with the growth of the city. The number of private motorised vehicles has increased very rapidly in the last 10-15 years. In 2018, the total number of vehicles in Pune had surpassed the human population and Pune was at rank one among all the urban areas in the country (Economic Times, 2018). This has led to health impacts from polluted air, accidents, and wastage of time in traffic congestion. Recognising the need to address this issue, the Pune Municipal Corporation (PMC) had adopted a Comprehensive Mobility Plan (CMP) in 2012. The vision for mobility in Pune articulated in the CMP is “*Moving people safely and economically by emphasising public transport and non-motorized transport*” (PMC Pune, 2017). As part of the efforts towards the realisation of this vision, the PMC initiated the preparation of a Comprehensive Bicycle Plan for Pune through a project supported by the Ministry of Housing and Urban Affairs, Government of India. A Bicycle Advisory Committee, consisting of experienced cyclist citizens, as well as officials from the concerned line departments of PMC, guided the process of plan preparation. The PMC General Body approved of the Comprehensive Bicycle Plan 2017.

The Pune Cycle Plan had proposals for the following items:

- Creation of a city-wide cycle track network and cycle-safe streets
- A city-wide Public Bicycle Share Scheme
- Bicycle Parking Facilities
- Integration with Public Transit
- Adoption and use of Design Guidelines for planning and implementing cycle-friendly infrastructure
- Awareness and Education Campaigns and Cycling Promotion
- Institutional Mechanisms, capacity-building and budget estimates for implementing the plan.

Work on the Pune Cycle Plan started in 2016, and extensive surveys were carried out in 2016 as part of the situation analysis. Two rounds of public consultations were done as part of the process of preparing this plan. The extensive survey conducted as part of this exercise had many exciting insights. The main reasons for cycling came out, as stated by cyclists (especially so in the case of younger people, older people, and women) are:



- health benefits
- affordability
- travel flexibility
- convenience

The survey results showed that men in the age group of 36-50 years are using cycles primarily for exercise. It was clear from survey results that the recognition of the health benefits of cycling is high across age-groups and genders. (PMC Pune, 2017).

The survey respondents who were non-cyclists or those who used to cycle but did not do so any more stated the following primary reasons:

- Not feeling safe to cycle,
- Travel time was too long as they might have long travel distances that is, more than the cyclable distance, beyond 4-5km,
- They do not find cycle parking facilities
- Feeling tired
- Polluted outdoors

From the Pune cycle plan, the critical stakeholders emerged are:

- Pune citizens as service users
- PMC as a service provider
- Enforcement officers and cycling evangelists as human service touchpoints among others
- Society and environment in Pune city

These critical stakeholders can be captured in the CraftChange Empathy Square, as shown in Figure 32. It indicates that while designing the interventions, the Pune Cycle team need to be empathetic to the concerns of all these significant stakeholders. They need to balance the concerns, expectations and the interests of all these critical stakeholders. This way, the CraftChange Empathy Square, as shown in Figure 32, helped to externalise the critical stakeholders to impress upon the need to balance the interests of all these stakeholders. It suggests to the designers to be empathetic to the stakeholders' concerns while designing the interventions and gives assurance to the involved stakeholders that their concerns will be taken care of during the process of designing the interventions.

It was evident from the report that Puneities (Pune citizens) love cycling and want a cycle-friendly Pune. The existing behaviour of Puneities can be synthesised as 'personal motored vehicles as a preferred mode of transport'. Through this cycle plan, PMC wants to encourage the target behaviour, i.e. 'cycling as a preferred mode of transport'.



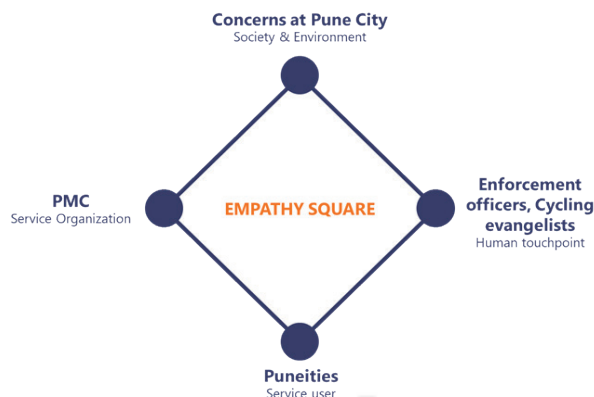


Figure 32: Formative Study1 - CraftChange KF vo.5 Empathy Square

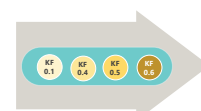
Considering the stated existing behaviour and the target behaviour, the Intervention Matrix, as shown in Figure 33, suggested to reduce the existing behaviour and to replace the existing behaviour with the target behaviour. The high-level guidance was influenced by the contextual constraints such as time to reach the desired destination, cycle’s capacity to carry luggage and the individual’s energy and stamina to cycle.

Since this is a classic sustained behaviour change case, the researcher tried to map the identified interventions to the CraftChange Behaviour Change Progression Model, as shown in Figure 34, to understand the usefulness and completeness.

The Pune cycle plan has designed interventions such as ‘Youth 4 cycles’, ‘Cycle to Work’, Work-place based promotion with an objective of Outreach and Promotion for various segments of society (PMC Pune, 2017). These stated interventions are aimed to increase awareness among Puneities about Cycling and its benefits. It is planned to increase awareness so that the people who are unaware will become

Target desired behavior	Reduce Existing Stop Existing	Increase Existing (If no constraints) Introduce target	<i>Contextual Constraint</i> - Time to reach - Capacity to carry luggage - Individual energy and stamina
	Replace Existing with New (Existing – preference for motored vehicle Target – Preference for cycle)	Balance (If constraints)	
Target undesired behavior	Prevent Target	Prevent Target	
	Stop Existing Reduce Existing	Increase Existing (Intensity, Duration)	
	Existing undesired behavior	Existing desired behavior	

Figure 33: Formative Study1 - CraftChange KF vo.5 Intervention Matrix



aware of this initiative. These interventions map to the ‘unaware’ stage in the CraftChange – Behaviour Change Progression Model.

The interventions such as promotion through celebrities and cartoons to communicate benefits are aimed at showcasing the benefits to various segments of society. These interventions will help Puneities to consider Cycling as an option for their commute

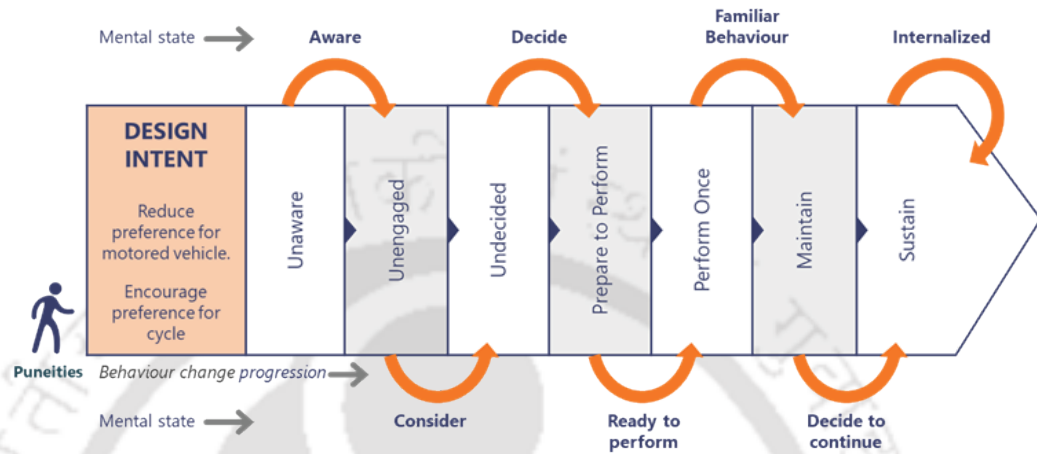


Figure 34: Formative Study1 - CraftChange KF v0.5 Bc Progression Model

by engaging them and actively thinking about it. These interventions mapped to the ‘Unengaged’ stage in the CraftChange – Behaviour Change Progression Model.

Some Puneities might not be considering cycling as an option due to the unavailability of cycles. Hence, the Pune cycle plan had planned for interventions such as, public Sharing Bicycles. The plan also has interventions which provide incentives to ‘Cycle 2 Us’ Partnership. To address various other concerns of Puneities, the Pune cycle plan has planned for Cycle Wardens Patrol, bring a friend program and cycle portal. These interventions are aimed at increasing availability, accessibility and providing social support to enable Puneities to decide to use the cycles. Hence these interventions are mapped to the ‘Undecided’ stage in the CraftChange – Behaviour Change Progression Model.

When people decide to perform specific actions, they may need some help to prepare. As Fogg says, for any action to happen, the person needs to be motivated, needs to have required abilities, and there must be a right trigger (Fogg, 2009). The interventions such as Cycle Evangelist, training, accessible cycles and Public Sharing Bicycles will help to prepare by enhancing the overall ability of a person. All these interventions are directed towards providing smooth access and emotional support to Puneities when they decide to use the cycle. Hence these interventions are mapped to the ‘Prepare to Perform’ stage in the CraftChange – Behaviour Change Progression Model.



As part of any behaviour change, doing any activity for the first time is very crucial. As mentioned earlier, the person in this stage may be motivated and may have all required abilities, but still may need the right trigger to make it happen. Pune Cycle Plan had a few interventions planned that were aimed at encouraging group activities such as Cycle day, recreational cycling and cycle rallies with a noble purpose. It becomes a much-required trigger to use a cycle for the first time. Hence these interventions are mapped to the 'Perform once' stage in the CraftChange – Behaviour Change Progression Model.

Once people perform an activity such as cycling, it becomes a familiar behaviour. The next logical step is to maintain this new behaviour for a specific time. During this stage, interventions aimed at incentivisation, inculcating a sense of pride and providing maintenance support and sense of safety may help to maintain the newly acquired cycling preference for a specified period. Interventions included such as incentives to 'Cycle 2 Us' with a partnership with malls and restaurants; providing membership and badges to display and creating a supporting structure by training of cycle mechanics. These interventions help to continue the behaviour, and hence these interventions have been mapped to the 'Maintain' stage in the CraftChange – Behaviour Change Progression Model.

Once people have maintained the new action in this case 'preference for cycling' for a specific short period, they then need encouragement to continue and help to sustain for a long time. Then it gets internalised and becomes natural behaviour. Pune cycle plan aims at increasing intensity and duration of participation by integrating the cycle infrastructure integration with Public Transit. The interventions from previous phases also help to achieve this. These interventions help to sustain behaviour for a long time. Hence, these interventions are mapped to the 'Sustain' stage in the CraftChange – Behaviour Change Progression Model.

In such scenarios, one does not want people to perform the new behaviour just by themselves but also to become advocates of this new behaviour. The Pune cycle plan has interventions such as public recognition, participation in Cycle Safety Plan, safety audits, lead the cycle rallies to encourage Puneities to become advocates of this new behaviour. These interventions help to encourage cycling enthusiasts to become advocates of this behaviour. Hence, these interventions can be mapped to the 'Advocate' stage in the CraftChange – Behaviour Change Progression Model, which was missing.

Prima Facie, it seems that the Pune cycle plan has covered all the stages of behaviour change progression with a varied set of interventions. It seems there is a need for additional interventions in stages where initially performed and in stages where the interventions need to be sustained. The same interventions will be helpful across the stages; for example, looking at the cycle rallies, people may get motivated to use cycles.



The CraftChange Knowledge Framework helped to identify the gaps in the designed service. This study helped to ascertain the completeness of the knowledge framework, but few improvements on certain aspects surfaced during this study. The need emerged to separate the interventions for ‘*internalisation*’ of the change and to encourage to become an advocate of the change.

Regarding Empathy Square, the confusion arose as to which node to start with, and what sequence the designers should follow. Both the concerns were addressed in the next version of the Knowledge framework, i.e. KF Vo.6 as discussed in section 5.2.3.1.

6.1.2 Reverse Case Study Mapping – Water Pouches

The second case study was from Ahmedabad. It examined a social issue of the environmental problem created by affordable two-rupee (approx. 0.03 USD) water pouches. Following are some snippets from the earlier published paper (Behaviour Progression Framework for Designing Sustained Behaviour Change, 2018). The complete paper is available as part of the Appendix.

India being a growing economy with a billion population, the problem of proper garbage dumping is an intense problem beyond the capacity of mere product-oriented design intervention. In Ahmedabad (India), 200 ml drinking water is available for purchase in small plastic-made pouches of INR 2.00 each. These chilled and ready to serve water pouches are available at almost every street-side tea shop. It is one of the most affordable and widely used products among the residents and visitors of the city. However, the after-use of the product has a significant impact on the cityscape. Only a small percentage of these plastic pouches get recycled. The rest either go to the city hillside dump yards or get scattered across the cityscape. The root of the problem, if observed carefully and holistically, is not easily traceable but is entwined within human behaviour, cultivated habits, available alternate products, evolved desires, awareness and induced ignorance. Hence, by solving just one part of the problem, it may not provide a sustainable solution. However, there is a need for a more systemic design intervention directed towards creating a new ecosystem. A potential ecosystem must address the need of the service users, the environment and the social fabric, maintain a profitable business for all stakeholders and yet cultivate a new behaviour towards consumption of drinking water (Das, 2017).

As the problem illustrates, there is a need for holistic Service Design for behaviour change that is a multidisciplinary endeavour. The popularisation of theories from behavioural economics has added an essential dimension to the knowledge available from other behavioural sciences. After examining several theoretical and practice related perspectives, this researcher decided to suggest directions for building a solution based on a Service Design framework oriented towards sustained behavioural change.



In this case study, some of the stated intentions are:

- The need to reduce consumption of water pouches
- The subsequent reduction in post-product-usage litter and waste creation
- Proper disposal of used water pouches and adequate recycling of the same
- Product replacement to be profitable to retailers (service providers) and affordable to service users
- and so on.

In this example, some of the latent intentions that could be identified for the service user are:

- economic affordability of fresh drinking water
- availability of chilled fresh water on-demand
- minimisation of health hazard due to improper dumping of used water-pouches
- prevention of deterioration of cityscape aesthetics and overall living-conditions of city residents

Fostering the idea of less litter creation by reducing the usage of water pouches needs a designed systemic intervention by thoroughly understanding the needs and desires of all the stakeholders. The designer designs the intervention first from the perspective of one node of the Empathy Square, for example, the service user. As shown in Figure 35, if the suggested intervention is to encourage a preference of reusable water bottles, then it needs to be triangulation with the concerns of other stakeholders in the Empathy Square. Although such a design intervention facilitates inculcation of environmentally sustainable action for the service user, further refinement of the intervention must be initiated to ensure it to be societally and environmentally ethical, profitable and that it extends to an easy transition for business and service-touchpoints for retailers (service providers). It should also be feasible and viable as a new service-based business for the erstwhile product-based businesses in the system. In this example, a possible behavioural design intervention

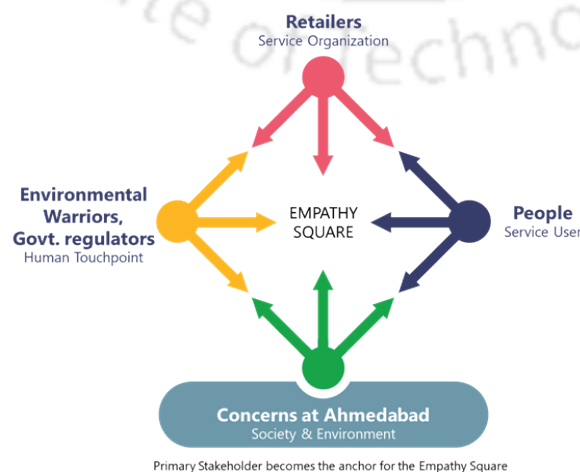


Figure 35: Formative Study2 - CraftChange KF vo.6 Empathy Square

can be that of inculcating a habit of carrying personal water bottles. Service Business can install drinking water kiosks to refill fresh and purified drinking water. These can be either a government-supported initiative or businesses run by the private water packaging industry operating on a pay-per-use basis. These kiosks can even provide the facility to clean the bottles to reduce the anxiety of hygiene among end-users towards the reusable bottles.

The Behaviour Change Matrix (Figure 36) represents the landscape of the various behavioural change possibilities. This researcher discussed with the designer, who was involved in identifying and designing the solution for this plastic-made pouches problem. During this discussion, this researcher used a think-aloud protocol and asked to describe how this designer will use the CraftChange Empathy Square and the Intervention Matrix. Unexpectedly, this designer came up with the various combinations of existing and target behaviours and came out with the different possible design strategies, as shown in Figure 36. He felt that CraftChange Empathy Square and Intervention Matrix were intriguing, which induced him to think comprehensively from various perspectives and to come up with various design ideas that otherwise their team may have been missed.

He felt that it would help a designer to decide the intervention quadrant and then get the guidance of intervention strategies for this intended behaviour change. This reverse case study mapping mainly focused on the use of the CraftChange Empathy Square and the Intervention Matrix only. This case study shows the use of the CraftChange Intervention Matrix to come up with various target behaviours to address the given problem holistically and decide the design themes.

Further, these newly formed target behaviours can be detailed using the CraftChange behaviour progression model. To achieve each such stated or latent intention of acquiring new and unfamiliar behaviour, the service user needs to go through various change stages that include being ‘unaware’ up till reaching the ‘sustain’ stage. In

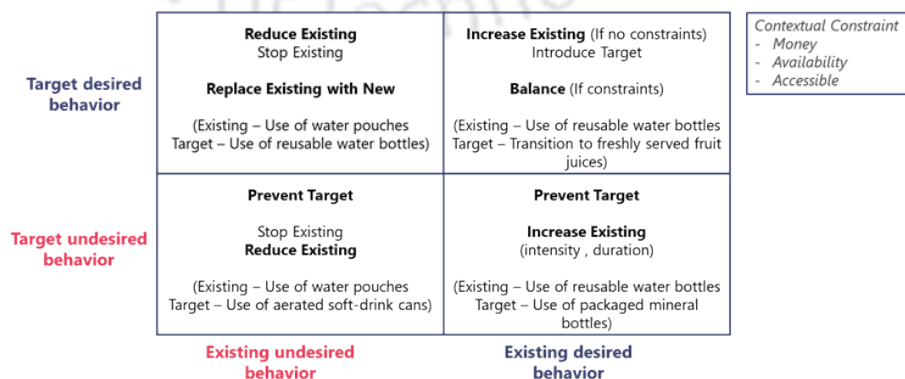


Figure 36: Formative Study2 - CraftChange KF vo.6 Intervention Matrix

this example, in order to incorporate the behavioural transition from the current usage of water pouches for quenching thirst, to adapting a new familiar behaviour such as a transition to refilling the reusable water bottles, the user will undergo the same journey of behavioural change stages. After this exercise, it was evident that the application of the CraftChange Empathy Square and Intervention Matrix helps the Service Designers to decide which stakeholder perspectives need consideration and how to approach designing the interventions for sustained behaviour change. The insights would be useful to guide Service Design practitioners in designing interventions for behavioural change – Policy level (for example, citizen well-being and welfare, poverty alleviation, sustainability), Social Sector (for example, livelihood creation, empowerment), Organisational level (for example, employee assimilation, employee well-being, work-life balance, compliance with norms). This knowledge, blended with contemplative practice has the potential to lead to successful solutions and meaningful value propositions for the users.

This formative study helped to ascertain the usefulness and completeness of the CraftChange Knowledge Framework. There were no adverse insights found from this exercise, and hence this did not lead to any refinement in the CraftChange Knowledge Framework Vo.6.

6.1.3 Social Sector Practitioner Interview – Health NGO

As part of the formative assessment of the CraftChange Knowledge Framework, we introduced the CraftChange behaviour progression model to a member of an NGO working on the ‘Youth in Transition’ project. This member is an anthropologist who has done his doctorate on population study. They had initiated this research to understand relationship choices and health needs to youth. Through one-to-one in-depth conversations with young participants, a strong need for unprejudiced, scientifically accurate discourse on matters of sexuality that would help young people to make informed choices to help them maintain their sexual health (Prayas Health Group, 2018).

“Love, relationship and sexuality are an integral part of an individual’s existence, but still so little is spoken about it. Some people choose to get into relationships, fall in love, some people choose not to. We live in a diverse society, with people of all genders, sexual inclinations and preferences, a matter of one’s personal choice. To be able to exercise choices is very pleasant, albeit with certain health risks involved with some of them. However, we talk so little about these choices, especially for ‘health needs’. For young unmarried people, it is even more difficult to find appropriate space to talk about these issues. In order to design appropriate intervention to address the sexual health needs of young people, it is first important to understand how relationships or sexual behaviour evolve



from adolescence to adulthood among unmarried youth? Are there any health risks? Does the youth have abilities to deal with the risks?”
 (Prayas Health Group, 2018).

On this backdrop, the NGO wanted to understand how the relationships of unmarried youth start and progress and is there any relation with a person’s education, career, migration, psychological health status and addictions. When the researcher had an in-depth discussion on the Behaviour Change Progression Model, the NGO member was immediately able to connect with the interventions they were planning as part of this project. The member liked the CraftChange progression model and found it very comprehensive, useful, intriguing. Most importantly, it made sense for the type of work they do. Just looking at the model, members started explaining the interventions that were planned for each phase as summarised in Figure 37.

The researcher received the most valuable insights out of this interview. The model helped the NGO member to identify the gaps. The NGO now plans the action for making interventions to address these gaps to make their solution comprehensive, covering all the stages of the behaviour change progression.

“This model is hypothesised for gap analysis. I can see the gap in our interventions immediately.” NGO practitioner

This formative study helped to ascertain the usefulness and completeness of the CraftChange Knowledge Framework in the given context. There were no adverse insights found during this exercise and hence this did not lead to any refinement in the CraftChange Knowledge Framework Vo.6.

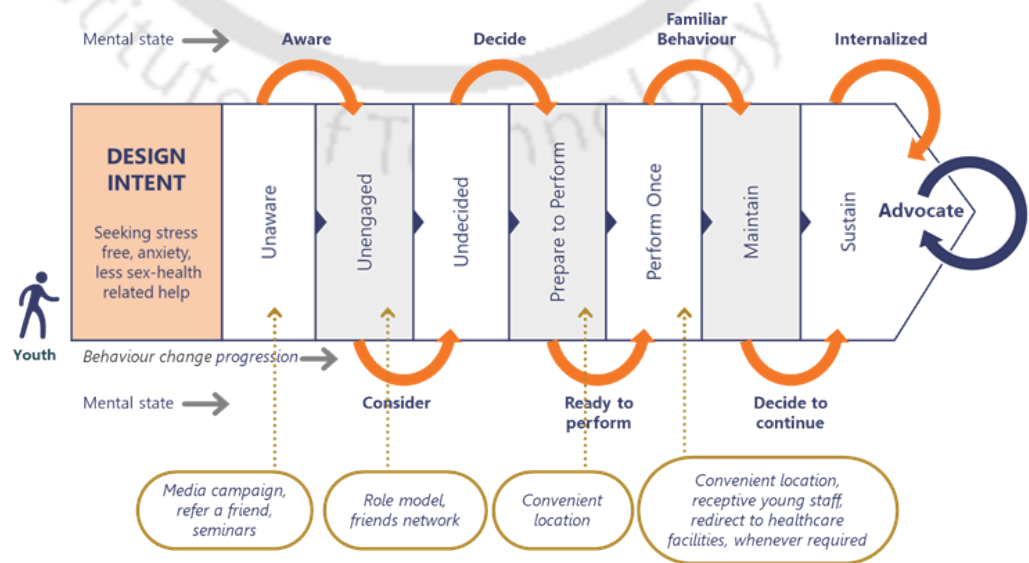


Figure 37: Formative Study3 - CraftChange KF vo.6 BC Progression Model

6.2 CraftChange Knowledge Framework V1.0

During the formative study 2 and 3, there was no adverse feedback received on Knowledge Framework KF-o.6. After saturation of the improvement feedback for the Knowledge Framework during the last two consecutive formative studies, it was decided to stop the formative studies and the CraftChange Knowledge Framework V1.0, was finalised as shown in Figure 38. To take it to its logical conclusion, we conducted one summative study, as discussed in section 6.3.

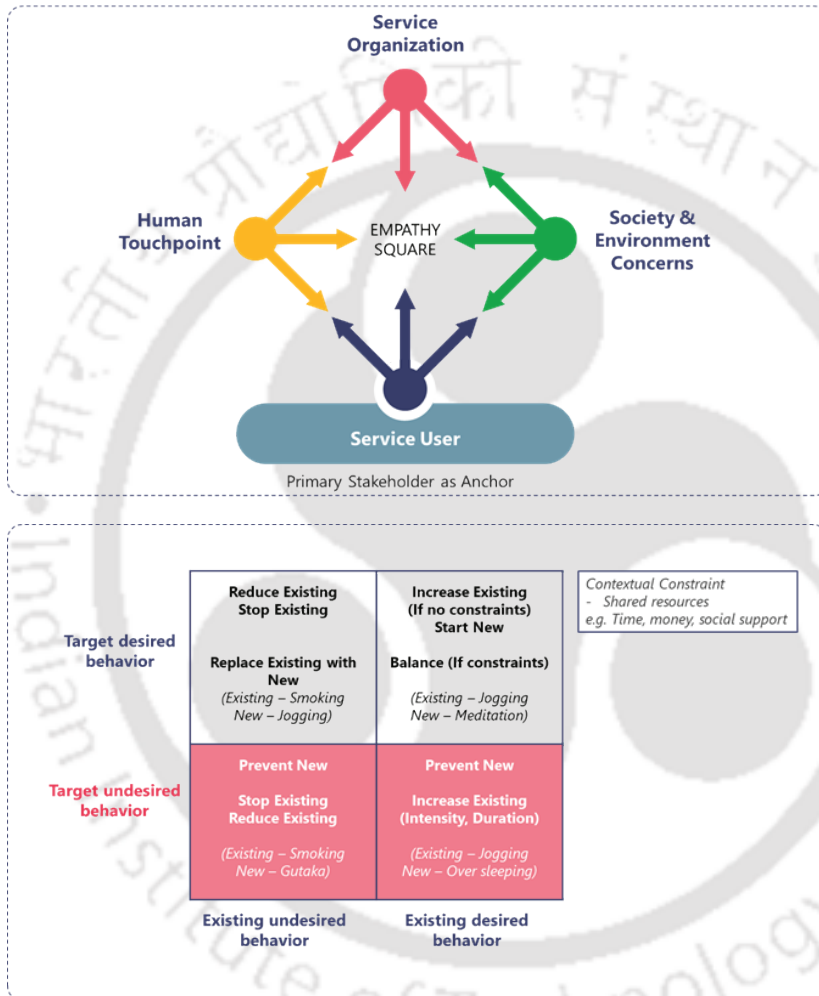


Figure 38: CraftChange Knowledge Framework V1.0

6.3 Summative Studies

6.3.1 Social Sector Practitioner Interview – Tahaan NGO

Tahaan- the Thirst, as the name speaks for itself, was started with the motive of “Let no one remain thirsty on this earth”. Tahaan is a young and dynamic group of volunteers with an immediate goal to quench the thirst of a drought-hit Maharashtra (India) – little step by step. Majority of the volunteers are students, working professionals



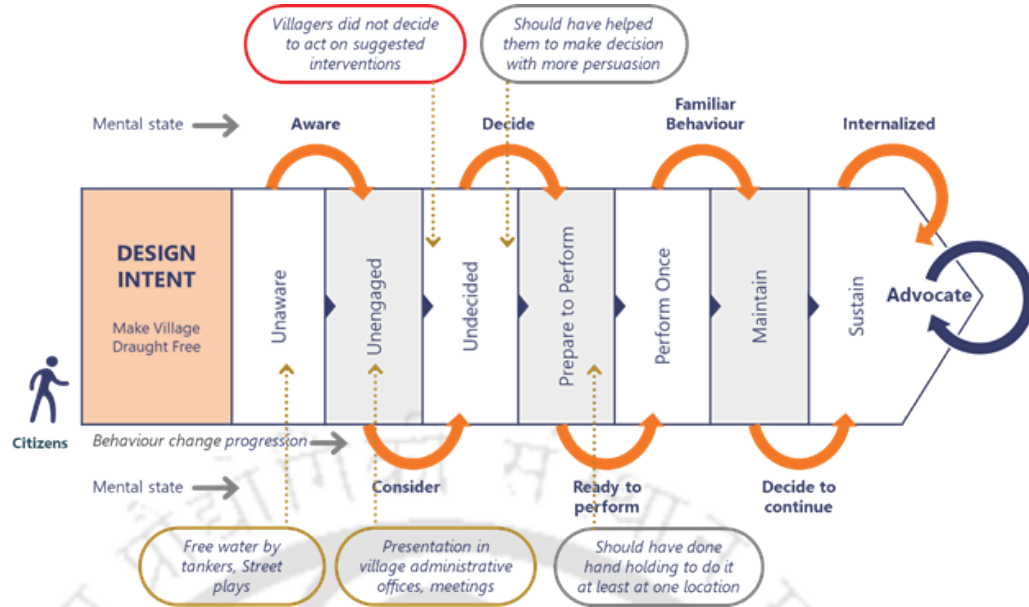


Figure 39: Tahaan NGO Case 1 – Unsuccessful Village Scenario

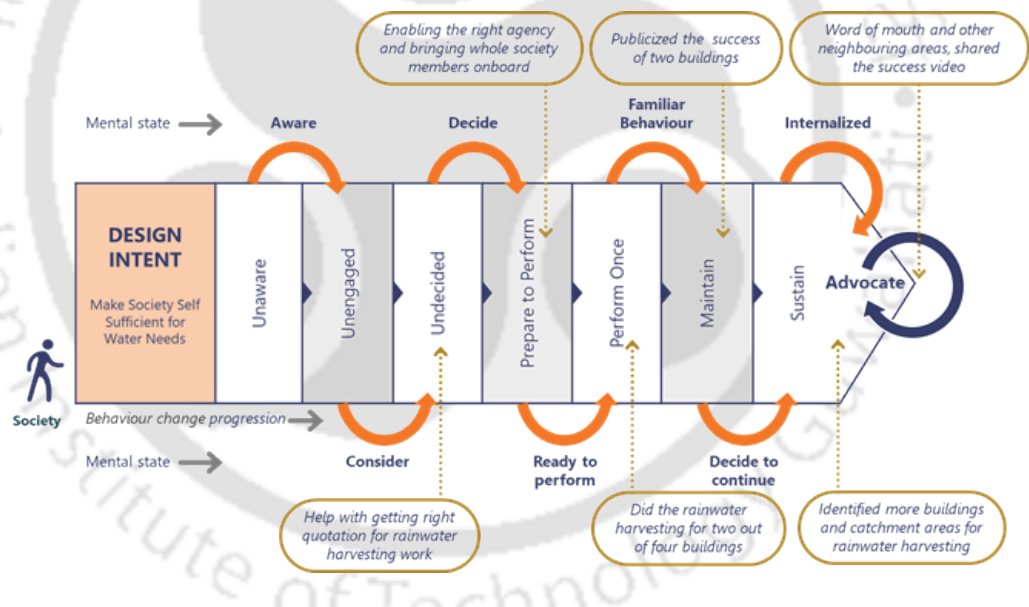


Figure 40: Tahaan NGO Case 2 – Successful Urban Scenario

and commoners from diverse fields and age groups. Some parts of Maharashtra face extreme water shortage. There are many hamlets and districts which are drought-hit and yet ignored by media and campaigners. The groundwater level in these villages has gone down drastically to shallow levels, leaving families with no water for daily necessities, forcing them to migrate. The rate of death due to suicide has also been alarmingly high in these regions.



Understanding the gravity of the issue, Tahaan since 2016, has been actively working in areas of water conservation and providing clean drinking water. Its volunteers work in villages as well as cities to plan the water resources and increase green cover.

The Practitioner found it useful to investigate why something failed (refer to Figure 39) and to understand why they were successful in some scenarios (refer Figure 40). Overall, the CraftChange Knowledge Framework was found fit for the purpose. As part of this summative study, the usefulness, completeness and effectiveness were established through various scenarios explained by the social practitioner.

6.4 Use Case 1 - Application for Sustainability

After the validation of the CraftChange Knowledge Framework, it was applied in practice. This section, along with section 6.5, describes how this was used in practice and how it benefited the Service Design team. These are the use cases emphasising the usefulness and effectiveness of Knowledge Framework in Service Design Practice.

Following section is derived from the researcher's paper (Empathy Square: An Aid for Service Design for Behaviour Change to Support Sustainability, 2019). The complete paper is available in the Appendix for reference (Appendix No - 9).

6.4.1 Background

Service Design for sustainability requires a human-centric, holistic and integrative approach that balances the individual's perspective and the broader economic, environmental, and social concerns. The design interventions are socio-technical in nature in which human beings play a crucial role. To contribute to the cause of sustainability, people often need to change and align their behaviours to sustainability goals. They may have to adopt a new behaviour, increase desirable behaviour, decrease and eventually cease current undesirable behaviour, or sometimes balance between the two equally desirable behaviours. These behaviour changes would typically progress as one time, initial behaviour change, a continuation of the changed behaviour for a short duration of time and eventually sustaining the behaviour for an extended period (Fogg, 2009). For the noble cause of sustainability, people would progress from being unaware of the needs to transform into a proper behaviour(s) and finally to become advocates of the intended, desirable behaviour change.



6.4.1.1 Sustainability from a social, economic and environmental perspective

Several researchers define sustainability as an interconnection between three pillars – environmental sustainability, economic sustainability and social sustainability (Elkington, 1997). Environmental sustainability is the process of maintaining a balanced environment by considering factors such as conservation of natural resources and environmental protection, among others on a long-term basis. Social sustainability aims at creating healthy and liveable communities both for current and future generations. Economic sustainability aims at having long-lasting and fair economic activities. Overall, sustainability is a broad area of research aiming at design, development, and use of resources in the environment to ensure a balance between meeting the current and future needs, while achieving social justice. Achieving sustainability requires intricate attention and conscious efforts towards the design and development of products and services. It involves a holistic approach considering technologies, change in human behaviour, human-made architectures, consumption of natural resources, among others.

Environmental and social sustainability-related problems are rooted in human behaviour. For example, the way one consumes natural resources might lead to scarcity of that resource in future or the way one uses products (for example, vehicles) for their convenience might lead to unsafe (polluted) environments for future generations. To achieve and to maintain environmental and social sustainability, individuals can contribute significantly by promoting sustained behaviour that can contribute to a more significant cause (Abusafieh & Razem, 2017). Therefore, there is a need to examine the role of human behaviour while designing sustainability-driven solutions. It is well established that design interventions influence user behaviour and hence, designers have the potential to consciously design products, services, and systems with an intent to change people's behaviour. While cultivating human values and socially desirable behaviours, designers need to understand the human-environment dynamics in promoting pro-environmental behaviour for users.

6.4.1.2 Holistic and Integrative Service Design

Designing services that evolve through a sequence of events is a user-centric activity of orchestrating people, infrastructure and communication as an integrative socio-technical system (Bitner, Ostrom, & Morgan, 2008) (Fensel, Facca, Simperl, & Toma, 2011). Service Design provides a holistic approach while solving problems by leveraging trans-disciplinary collaborations. It encompasses the design of all human-human and human-machine interactions involved in the service. It also focuses on the service environment and service experiences, by dealing with the emotions and values of humans along with the functionality of the service in a given context. Design in general and Service Design can shape user's behaviour and facilitate to

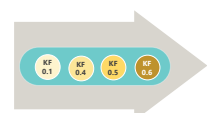


maintain it for an extended period. When a service user is using the service for a duration, the behaviour of an individual or within a group is influenced by the designed product-service systems. Changing or shaping an individual's behaviour, eventually, after a time, is a starting point towards the change at a broader level, for example, societal level.

Users of today have an abundance of choices of products and services. Service providers find challenges in being a differentiator in the market and sustaining their users. Value creation through impactful service experiences is the locus of service-providing organisations today. Traditionally, it was a common assumption that organisations could solely design, develop, and sell products and services with little or no interference from their users. This assumption is slowly fading away, and the need for value co-creation is becoming more prominent, wherein the users are actively engaged, rather than merely being passive recipients of the service. (Prahalad & Ramaswamy, 2004) (Prahalad & Ramaswamy, 2004). Value co-creation can be defined as a *“benefit realised from the integration of resources through activities and interactions with collaborators in the customer's service network.”* (McColl-Kennedy, Vargo, Dagger, Sweeney, & Kasteren, 2012). Co-creation of value is heavily based on the interactions between the user and the provider, of which the essential components have been identified as dialogue, access, transparency, relationship, and some others (Prahalad & Ramaswamy, 2004) (Hansemark & Albinsson, 2004). Along with the service users, human touchpoints, i.e. service staff involved in service, play a crucial role in enabling the value co-creation for a user.

6.4.2 Role of Businesses and Corporations in Sustainability

Every human being is responsible for shaping a sustainable ecosystem. Individuals, group of individuals, businesses, and government organisations share an active responsibility in crafting and enabling activities that create a symbiotic and sustainable tomorrow. With the increasing rate of climate change affecting the global landscape, it is imperative to include sustainable design as an integral part of business models and state policies. The transformational era of higher automation and interconnectedness in industries compel the latter to initiate sustainable design not as a separate corporate social responsibility but as a core to every industrial activity by leveraging smart solutions that facilitate long term relationships rather than one term consumerism. The movement towards being empathetic towards society and the environment as part of the business planning and not as a separate corporate social responsibility, i.e. the CSR initiatives are now evident in organisational practices. It is the right time to adopt social and environmental responsibility through every corporate action.



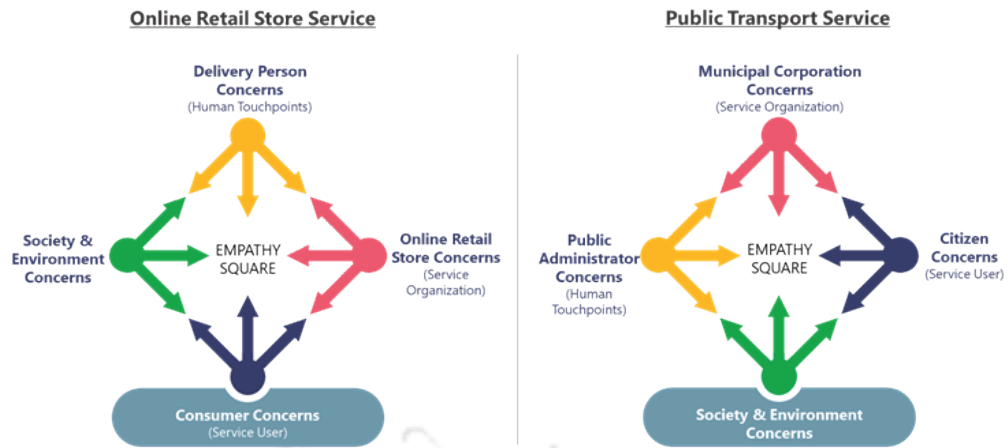


Figure 41: Use Case 1 - CraftChange KF v1.0 Empathy Square

6.4.3 Empathy Square

Design for sustainability is not just a human-centred design approach but an ecosystem-based holistic design attitude which enables rich symbiosis between the stakeholders constituting the ecosystem. The stakeholders can be majorly categorised as users, design enablers such as industry, service providers, business organisations, society, and environment (includes various flora and fauna). An integrative design approach for sustainability must include the perspectives, concerns, desires, and mutual benefit of all the stakeholders. Let us take an example; Electric cars are positioned as eco-friendly vehicles because they run on battery-stored electricity-producing no poisonous smoke, minimising air pollution for a safer environment. However, if one observes with a holistic lens, one can see the amount of pollution that emerges during the manufacturing process of electric batteries that are used in Electric cars. Furthermore, it is worth wondering about the lifecycle of all the other materials that are used in the cars, and their possible impact on the holistic sustainability of our living ecosystem (Tesla's Electric Cars Aren't as Green as You Might Think, 2016).

The design philosophy of Design for Circular Economy (Ellen MacArthur Foundation, 2015) enables designers to look at the complete lifecycle of products and materials and directs the design ideation from building 'consumership' of products towards 'usership' of the same. Circular Economy enables this paradigm shift in design ideation towards Design for Sustainability by engaging into six principles (Macarthur, 2006) namely: designing out waste, building resilience in diversity, thinking in cascades, thinking in systems, shifting to renewables, and by focusing on restoration and regeneration.



The Empathy Square requires the design team to explicitly articulate and match, not only the concerns of the service provider and service user but also those of the

human touchpoints (the staff) and of the society and environments, as entities that have the rights to be 'served' and fulfilled in order to achieve sustainability.

In case of online retail shops, to address the concerns of the service user, i.e. purchasing required goods effortlessly, anywhere at an affordable cost, service organisations are providing access to the various goods at affordable rates through their websites and mobile apps to the service users leading to increase in gross revenue. To make it affordable, the service organisations need to address the concerns of the human touchpoints that are in this case, a delivery person from a social and economic wellbeing perspective. While making it affordable to the service users, organisations should not give inadequate wages to the delivery person leading to negligence towards their social and economic wellbeing.

The environmental concerns need to be taken care of, by reducing plastic usage as part of packaging and use of non-polluting vehicles to deliver goods. For example, the iPhone ships with a biodegradable potato-starch-based shipping material rather than plastics (Sheesley, 2008). Thus, by addressing the concerns of all the four major stakeholders, the overall solution can be sustainable.

There is no sequence to start from a specific node of Empathy Square. Designers may start with a node that requires immediate attention, and that node can act as an anchor for the other three nodes, as shown in Figure 41. If it is a sustainability initiative, then designers may start from society and environment node and sequentially move to the other nodes. For an employee wellbeing initiative, the designer can start with the human-touchpoint node and then balance the concerns within other nodes. It is essential to be empathetic to the concerns of all four nodes while designing services to sustain it for a more extended period.

6.4.4 Use Case Reflections

Service Design, due to its holistic and long temporal nature, is the desired approach where sustainability concerns are to be addressed sustainably. People's sustained behaviour plays a crucial role in sustainability endeavours. If Service Design takes care of sustainability concerns by designing for sustained behaviour change, it will contribute to a long-lasting impact.

With a drastic increase in awareness about sustainable actions among people, society and organisations, it is inevitable to address the concerns of all the four stakeholders consistently through actions, as part of their business. This shift from sustainability as a CSR activity to becoming a crucial element of core business strategy has started, and this congruence can expedite the process. We believe that this knowledge will be helpful while designing impactful design interventions, addressing sustainability concerns.



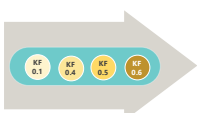
6.5 Use Case 2 - Proliferating Service Design in a large multi-cultural IT organisation

In light of product companies shifting towards services, there is a greater need for Service Design. However, organisations are still not fully ready for this shift. Organisations are getting ready through multiple ways of Service Design proliferation. Notably, IT service organisations are unique, which in turn help their customers which are organisations going through the shift themselves. It is inevitable that unless IT organisations are ready for this shift, they will be unable to do an adequate job. The researcher explored an inside-out approach where the employees of IT organisations first reap the benefits of Service Design and then get excited and motivated to serve their customer organisations. It is a part of the research paper (Proliferating Service Design in a large multi-cultural IT organisation – an inside-out approach). It is a vibrant example of ‘internalising through experiencing’ approach for Service Design in the context of its proliferation exploiting barriers and opportunities. This section is derived from this researcher’s paper (Proliferating Service Design in a large multi-cultural IT organisation – an inside-out approach, ServDes 2020).

6.5.1 Case Study Introduction

With the emergence of Industry 4.0, organisations are rapidly embracing advanced digitalisation through technologies such as, Artificial Intelligence (AI) and Internet of Things (IoT). Added to this, the changing global scenario of depleting resources and increased demand for customer experience has made organisations look for sustainable and ecosystem-centred business models. It has fuelled organisations to transition from a product mindset to services as their primary customer offering (Vickers & Merkofer, 2018). Organisations are leveraging the power of smart and integrative technologies. Organisations have been able to generate higher customer value and meet customer needs by integrating individualised solution offerings and multichannel customer interactions through personalisation, efficient logistics systems, creative revenue models, and innovative designs (Geissbauer et al., 2018). It has further proliferated the need and ability of Service Design for service-oriented organisations to deliver experience-centric-services (Voss et al., 2008).

Service organisations today have complex processes spread across physical and digital space involving several stakeholders. With entwined interaction channels and enabling user access to both human and digital touchpoints, it becomes imperative for these organisations to increasingly adopt and proliferate Service Design methods across their organisation to create experience-centric-services and promote service differentiation and customer loyalty.



IT Service organisations are also going through this transition. The exciting part is that though these are IT service organisations, there are very few companies who have embraced the Service Design philosophy. They are uniquely placed, where they must help their customers who are organisations going through the shift towards services themselves. Hence unless IT organisations are ready for this shift, they will be unable to do an active job to help their customer organisations. Typically, IT service organisations are relatively large, have a global presence, and maintain a workforce from diverse cultural backgrounds. These organisations often have multi-disciplinary teams that are co-located at different geographical locations with high interdependencies. The organisations also experience high inflow and outflow of the workforce, resulting in the need to innovate organisational services to cater to the emerging employee needs. In a large multi-cultural IT organisation, Service Design activity is often susceptible to the organisational structures, politics, culture, informal opinions and knowledge accessibility restrictions (Blomkvist, 2015). The existing organisational settings often create work silos, which further hampers sustained collaboration between actors (Atvur et al., 2015).

This case study highlights the usefulness of an inside-out Service Design approach for a large IT organisation and provides recommendations on various Service Design activities that can facilitate its proliferation. Acknowledging the barriers to Service Design adoption faced by us in an IT organisation, it was clear that one needs to focus on the employees and stakeholders within the organisations and should get a first-hand experience of the value of Service Design. The researcher and team felt that the most persuasive way would be first to address internal employee services while adapting tools and techniques for the organisational context. Rarely a behavioural science approach being used for facilitating this transformation journey. This case study explored the CraftChange Behaviour Change Progression Model to facilitate this shift.

6.5.2 Inside-out approach

The transformation of organisational culture drives organisational transformation; and employees need to be supported by the knowledge, skills and motivation to adapt to new changes. Organisational culture has a critical influence on the overall well-being of employees. It is imperative to state that top-to-bottom approach to influence organisational culture requires detailed planning and demands employee allegiance to the same, but a bottom-to-top approach enables employees to iteratively create an organisational culture where they feel co-ownership of, e.g., Muhammad Yunus's 'Grameen Bank' (Simanis & Hart, 2011). Therefore, this proposed 'inside-out' Service Design proliferation approach tried to incorporate the benefits of both top-to-bottom and bottom-to-top approaches.



The researcher looked at this transition through the lens of behaviour change. The CraftChange Service Design Framework for sustained behaviour change provided the required rigour and guidance to go through this transformational journey. For proliferating Service Design in organisations, the research team proposed an inside-out strategy—where ‘inside’ refers to internal employee services and ‘out’ refers to the products or services meant for external customers. By gradually building competency, tools and exposure to Service Design internally, the organisation and its employees can be empowered to apply it at scale to its business clients, passing on the value to their business.

6.5.2.1 Progression using CraftChange

As per the CraftChange Behaviour Change Progression Model, the employees go through the journey of becoming aware, getting engaged and getting familiar with the benefits of Service Design by experiencing it. CraftChange advises to first consider the current context by studying existing interventions based on Current Intervention Cards, as explained in section 8.1.1.5.1.

After understanding the current context, the research team embarked on a journey of developing internal employee services. Services that touch upon the entire employee journey in an organisation—right from job search, application, recruitment and onboarding, to long-term assimilation and retention within the organisation were selected for their impact.

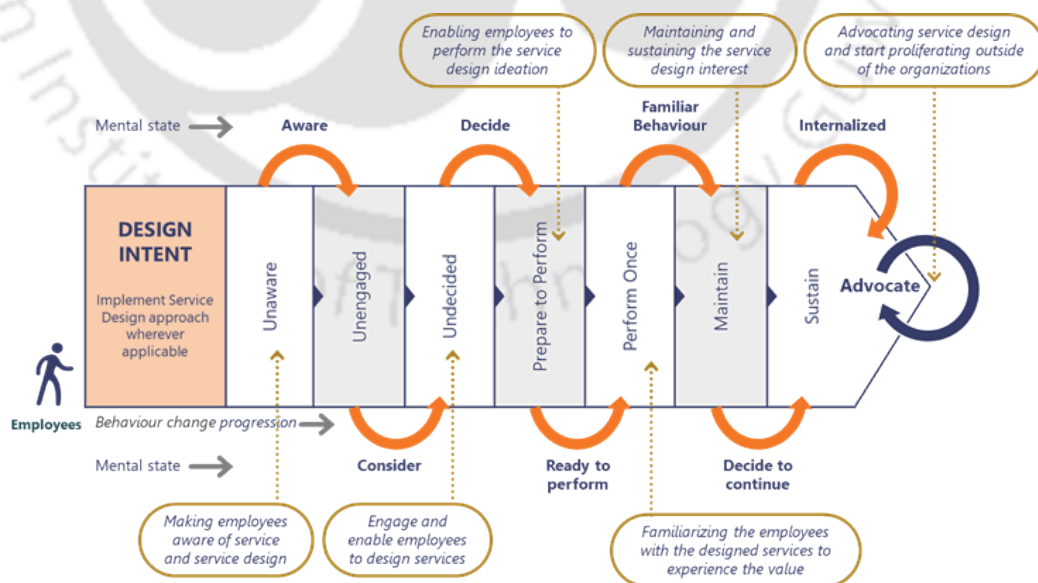


Figure 42: Use Case 2 - CraftChange KF v1.0 BC Progression Model



As indicated in Figure 42, the research team planned the following interventions for each phase. Here, the intent was to change the behaviour of organisational employees from being unaware of Service Design to becoming advocates of the Service Design process. Here, the advocate stage is where the employees of IT organisations start advocating the Service Design approach to their customers who are the organisations in multiple domains such as, banking and finance, insurance, governance, to name a few. Before starting the proliferation process, first, one needs to access the current state of the Service Design knowledge among the employees to determine their current stage concerning behaviour change. It helps to identify the stages for which interventions need to be designed to become an advocate of the given intent, i.e. proliferation of Service Design. In this proliferation, the journey, started from an 'unaware' stage, as explained in the subsequent section. The design intent here is to introduce the new behaviour of using the Service Design approach wherever applicable.

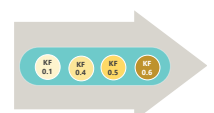
6.5.3 Case Study Conclusions

Considering the Service Design proliferation as a behaviour change problem and applying the CraftChange behaviour progression model helped to look at it systematically. We explored an inside-out approach by addressing employee-centric services first to proliferate Service Design in the organisation. We have outlined ways to engage in a quasi-participatory approach, externalise for distributed cognition, leverage tacit-knowledge of employees, and use tools such as, communicative Service Blueprint notations, Service Design patterns, and behaviour progression frameworks. We have been successful in garnering interest and facilitating the impact of Service Design within the organisation through projects like employee referral, onboarding and integration services. The initial work has also proliferated engagements with clientele projects to design and develop experience-centric-services.

During this journey, the research team observed the gradual increased visibility, interest and engagements with other business units in the organisation is attributed to the ongoing work on employee services. It enforces the belief that an inside-out approach can be powerful in demonstrating the impact of Service Design and motivating the organisation to adapt its approaches.

6.6 Chapter Conclusion

This Chapter explains the total of four 'Plan-Act-Observe-Reflect-Refine' cycles which includes three formative studies (two reverse case study mapping and one social sector practitioner interview) and one Summative study with social sector practitioner as shown in Figure 31. The primary purpose of these assessment studies



	Empathy Square	Intervention Matrix	Progression Model	Empathy Square	Intervention Matrix	Progression Model
Pune Cycle Plan Reverse Mapping	✓	✓	✓	✓	✓	✓
Water Pouches Reverse Mapping	✓	✓		✓	✓	
Health Sector NGO Interview			✓			✓
Tahan NGO Interview	✓		✓	✓		✓
Sustainability Application	✓	✓		✓	✓	
Sustainability Application	✓		✓	✓		✓

Usefulness Completeness

Chart 12: CraftChange Knowledge Framework Assessment Coverage

was to find usefulness and completeness of the CraftChange Knowledge Framework and the end of the multiple iterations established this. There was significant variation in which the CraftChange Knowledge Framework was used in various case studies. Hence it was difficult to establish its effectiveness as part of the assessment criteria. The effectiveness was evaluated as part of the assessment of the CraftChange Toolkit which is the actionable manifestation of this knowledge framework.

Chart 12 provides the dashboard of the multiple formative and summative studies, which helped to assess the various components individually as well as in an integrated way. The tick indicates that the component was assessed during the corresponding study from the usefulness and completeness perspective.

The next Chapter elaborates the CraftChange Toolkit, which makes the Knowledge Framework actionable along with the CraftChange process.



7 Development of CraftChange Toolkit

'Knowing' and 'Doing' are two mutually dependent aspects – knowledge drawing from practice in leading to experience. In literature, a lot is talked about 'knowing' and 'doing'. Following are a few prominent quotes expressing the criticality of these aspects:

"I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do."

Leonardo da Vinci

"People tell me this is obvious. But it's ok to be obvious. Knowing and doing are different. Many people know many obvious things they completely fail to do, despite their knowledge."

Scott Berkun

"The three elements of creativity are thus: loving, knowing, and doing - or heart, mind, and hands - or, as Zen Buddhist teaching has it; great faith, great question, and great courage."

Eric Maisel

"The greatest gap in life is the one between knowing and doing."

Richard Biggs

Just knowing is not enough unless it is supported by doing. With the same spirit, the behaviour insights gathered from various disciplines synthesised in the CraftChange Knowledge Framework need to be made available as actionable guidance. The objective was to enable Service Designers to design service around behaviour change by triggering creative thinking, empowering different ways of looking at problems and ideas.

Earlier attempts have been made by Dalsgaard and Dindler (2014) in bridging concepts between theory and practice. Drawing from behaviour change principles; and models and frameworks from various disciplines, the researcher developed an

integrated actionable guide. The Service Design life cycle was at the centre while bridging these concepts. These concepts were embedded in the Service Design life cycle because it is intended towards the Service Designers, who are facilitating the progression towards the sustained behaviour change for the common good of stakeholders. As explained in the *'Iterative Conceptualization'* section (Chapter 5 – 5.2), the CraftChange Framework is conceptualised as the bridging concept between the various behaviour change theories and Service Design practice.

Changing behaviour is primarily a choreographed systematic plan that follows a logical sequence of interconnected stages. This plan gets executed through the designed interventions aiming *"to get an individual or a population to behave differently from how s/he or they would have acted without such an action"* (Michie, 2014). It has both 'knowing' and 'doing' aspects. The CraftChange Knowledge Framework has the following three main components:

1. Behaviour Progression Model adopted the concepts from the Precaution Adoption Process, Transtheoretical Model - Stages of Change, CREATE Action Funnel - Stephen Wendel, Behaviour Change Wheel - Susan Michie and behaviour Wizard Fogg and Hreha.
2. Empathy Square which captures the holistic-ness by indicating the concerns of four significant stakeholders
3. Intervention Matrix which provides the high-level design guidance

This CraftChange Knowledge Framework which represents the *'knowing'* is realised as the CraftChange Toolkit as explained in the following sections to facilitate the *'doing'*, i.e. designing the services for sustained behaviour change.

7.1 CraftChange Toolkit Conceptualisation

As explained in section 4.3, the Knowledge Framework informs the Actionable Framework during its realisation process. Considering this, the CraftChange Knowledge Framework realised into the Actionable Framework, i.e. the CraftChange Toolkit by making the knowledge available during the Service Design process.

As per the Nigel Cross (1982), the primary sources of design knowledge are people, process and product. It means, if knowledge is made available through these three means, then it will reach the intended people. In retrospect, the researcher decided to embed the knowledge in People, Process and Product so that it will be discoverable as shown in Figure 43.



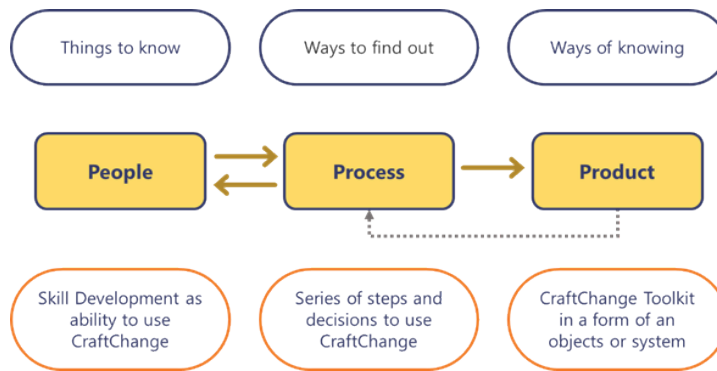


Figure 43: Nigel Cross Taxonomy Mapping

to be made available to Service Designers who want to design for sustained behaviour change. Here '*People*' means the Service Designers, '*Process*' means how to use the CraftChange Framework while designing services and '*Product*' means the CraftChange Toolkit, which is intended to be used while designing services. With this objective, mainly focused on designing and developing the '*Process*' and '*Product*', where the '*People*' part is addressed through training (refer to 8.6.5.1 and 8.6.5.2).

As explained in Chapter 4 - section 4.3 (Distributed Cognition as the soul of Framework Development) and as shown in Figure 43, the framework architecture is taking care of '*things to know*' in '*Knowledge Integration Layer*', '*ways to find out*' in '*Process Layer*' and '*ways of knowing*' through '*Artefacts Integration Layer*'.

The following section is mainly focused on the '*Process Layer*' and '*Artefact Integration Layer*' through the design and development of CraftChange Actionable Framework. As indicated in Figure 13 and Figure 14, it is iterative design and development through action research through multiple '*Plan-Act-Observe-Reflect-Refine*' Cycles, as explained in Chapter 4 (Research Methodology).

The CraftChange Toolkit is intended to provide a structure to Service Designers while designing services, instead of keeping it open-ended to them. As part of the Service Design process, people need to work collaboratively, and the CraftChange Toolkit needs to act as an aid to externalise the knowledge residing in people and binding it to the process. Externalisation of knowledge happens through the in-process artefacts, which is an essential component of Distributed Cognition (Mahamuni, Khambete, & Mokashi Punekar, 2017). The CraftChange Toolkit is aimed to provide structure for people to think and convert their tacit knowledge to bring it out and collaborate (Nonaka, Takeuchi, & Umemoto, 1996). Knowledge gets converted into the product or service through the process. Knowledge resides in people. In case of a participatory and multi-disciplinary team, knowledge resides in many people. Therefore, the CraftChange Toolkit needs to bind many people



together and facilitate the creation of the service. The CraftChange Toolkit needs to bring in knowledge, bring in process and allow its synthesis so that the service gets designed.

The CraftChange Framework has the CraftChange Toolkit as the main component to make it actionable. The three aspects that the CraftChange Toolkit needs to address are: the form, content and the process of the application. Considering the literature review, surveys and the organisational case study undergone earlier, the characteristics of the toolkit that emerged included the following:

- Should enable the visual Framework to act as self-explanatory
- Should enable many people to work together
- Should enable bringing out the tacit knowledge of involved participants
- Should encourage the interaction with the toolkit
- Should support the flexibility of use
- Should support the process of evolution of the intended design (make changes in Service Design, the evolution of Service Design, iterative conceptualisation and design of services)

These characteristics helped to determine the form, content and the process of application of the CraftChange Toolkit.

7.1.1 People – Service Designers

The focus is on people, especially on the Service Designers and other participants. Here a multidisciplinary team perspective can be considered.

The CraftChange Knowledge Framework encapsulates the ‘*things to know*’ while designing services for sustained behaviour change. This Knowledge Framework informs the training requirements for skill development of people, i.e. Service Designers and others. The details of the training plan and content are explained in section 8.6.5.1 and 8.6.5.2.

7.1.2 Process – CraftChange Process

The CraftChange Process is based on the CraftChange Knowledge Framework that informs the ‘ways to find out’ and identify the intervention points during the



already known Service Design process. The idea here is not to come up with a new prescriptive Service Design process but to identify the intervention points and to provide the add-ons on the existing, well-established Service Design process. The process influences and guides in what form the CraftChange Knowledge Framework should be made available for the Service Designers. As a first step, one deliberates and identifies the intervention points in the Service Design process, where additional activities are either required or activities that need to be done differently while designing the services for sustained behaviour change. The essential aspects of behaviour change from a Service Design perspective are understanding the current context and current behaviour, determine the target behaviour and design the interventions for behaviour change life cycle. Considering the standard Service Design process, the following intervention points were identified:

- User research
- User research data synthesis
- Redefining the design brief
- Persona development
- Ideation
- Idea refinement
- Service concept creation and detailing
- Service concept value representation

As shown in Figure 43, the product influences the process and hence after the CraftChange Toolkit development, the CraftChange process was refined and finalised, as explained in section 6.2.5 (CraftChange Process - Actionable Guidance).

7.1.3 Product – CraftChange Toolkit

As explained in Chapter 2 – section 2.1.1 (Product, Experience and Service), the product is an object or system made available for a user that serves a need or purpose. Throughout this thesis, the researcher is helping Service Designers to design services for sustained behaviour change through an entity, i.e. CraftChange Actionable Framework. The part of research question RQ1: “.... a form of integrated actionable guidance made available to the Service Designers, who are facilitating the progression towards the sustained behaviour change” is being made available as a product, which Service Designers can use to meet the purpose of designing services for sustained behaviour change. CraftChange Toolkit was treated as a product, and so, various product development methodologies were evaluated to select those best suited for this purpose. For convenience, the CraftChange Actionable Framework is referred to as CraftChange Toolkit.

Design and development of the Toolkit is not a typical product development exercise.



It inherently has some initial vagueness associated with it. It is different from typical product development since all the specifications are not known upfront. After going through the various product design methodologies, the following two product design process and framework in line with the overall research methodology were chosen and followed in this thesis. CraftChange research methodology is based on action research principles through multiple - ‘Plan-Act-Observe-Reflect-Refine’ cycles. As explained in Chapter 4 (Research Methodology), the following two methods support the modular structure.

- Phase model of the Product Design Process by VDI (Roozenburg & Eekels, 1995)
- The Function Behaviour Structure (FBS) Framework (Gero & Kannengiesser, 2014)

The FBS, i.e. Function, Behaviour and Structure ontology, helps to conceptualise the design objects, i.e. CraftChange Toolkit. The FBS ontology helps to externalise the expected behaviour and its interplay with the designed structures supported through iterative cycles. The Phase model is found to be suitable for the CraftChange Toolkit, considering its logical overlap with the FBS framework. They extend support for the modular structure development and progressive product evolution. As shown in Figure 44, the Phase model and FBS framework are used in spirit during the design and development of the CraftChange Toolkit.

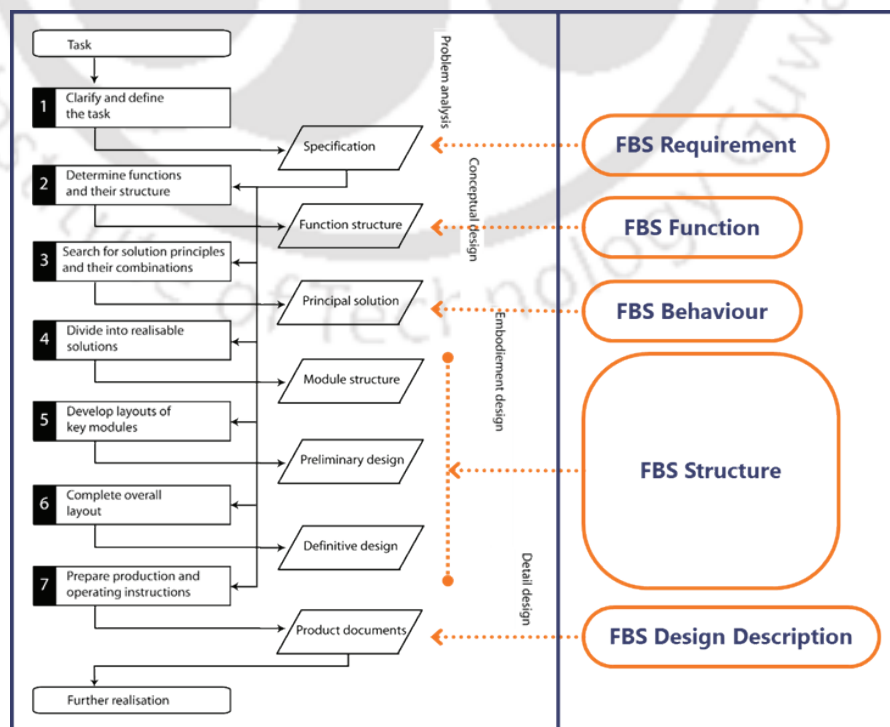
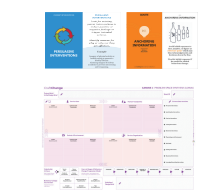


Figure 44: Phase Model of the Product Design Process by VDI and the FBS Framework.



As shown in Figure 44, the CraftChange Toolkit design process matches with the overall research methodology followed in this thesis which is based on action research principles and iterative cycles.

7.2 CraftChange Toolkit Design and

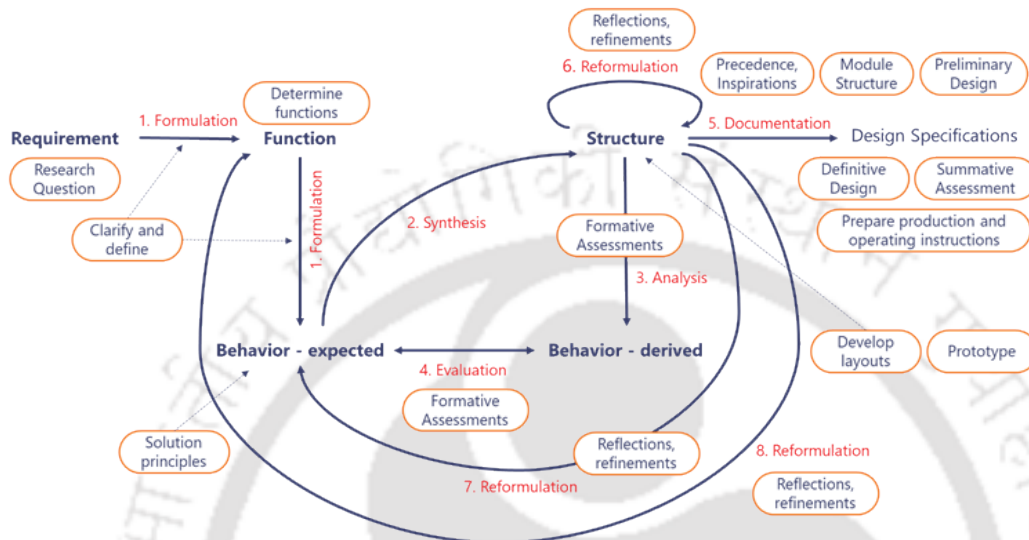


Figure 45: CraftChange Toolkit Design Process

Development

The following section describes the CraftChange Toolkit design and development using the process depicted in Figure 45.

7.2.1 Formulation - Plan

The formulation is about understanding the set of goals and constraints. It helps to add clarity about the design brief and determines the functions of the product, in this case, CraftChange Toolkit. It is also a ‘Plan’ phase of the ‘Plan-Act-Observe-Reflect-Refine’, Cycle.

The part of the research question RQ1: “.... a form of integrated actionable guidance made available to the Service Designers, who are facilitating the progression towards the sustained behaviour change” provides the design brief to formulate the function of this Toolkit. The Toolkit needs to be developed for the context such as multidisciplinary team, supporting participatory design methods covering Service Design life cycle. The Toolkit is aimed at making CraftChange Knowledge Framework actionable along with the list of behaviour change principles with playfulness.



After the deliberation, the functions of the CraftChange Toolkit were identified.

The functions of CraftChange Toolkit are as follows:

- Provide 'ways of knowing' behaviour change aspects during the Service Design life cycle in an actionable form
- Embed the design process soul, i.e. divergence and convergence at appropriate points
- Enable designing of services with its characteristics of evidencing, sequencing, value co-creation, human-centred and holistic
- Provide enablers without curbing the creativity of Service Designers
- Provide the positivity (conflict-free participation of multi-disciplinary stakeholders) throughout the Service Design process due to the multidisciplinary and participatory nature of the design process
- Enable externalisation of knowledge / distributed cognition
- Provide continuity in the design process

For the identified functions, the researcher deliberated and listed expected behaviours from the toolkit. These behaviours act as solution principles while conceptualising and designing the structure of the toolkit.

Expected Behaviour from the CraftChange Toolkit

- Effortless access to the integrated knowledge
- Completeness concerning the Service Design life cycle
- Usefulness regarding achieving the intent
- Effectiveness during the Service Design process
- Self-explanatory visual Framework
- Enablement of many people working together
- Enablement to bring out the tacit knowledge of involved participants



- Encouragement to the interaction with the toolkit
- Flexibility of use
- Enablement of the evolution process of the intended design (make changes in Service Design, the evolution of Service Design, iterative conceptualisation and design of services)

7.2.2 Synthesis (Iterations 1-2) - Act

Synthesis is a step to instantiate the design solution in terms of different modules to support the identified functions and behaviour. The synthesis process aims to arrive at the required structure by meticulously exploring the precedence and looking at the inspirations. It is an iterative process of coming up with the modular structure, layouts and preliminary Design. These preliminary designs iteratively get finalised through prototype building and evaluating it. The structure of this CraftChange Toolkit expects to have logical and physical interconnected operations and flow of information. It is also an ‘Act’ phase of the ‘Plan-Act-Observe-Reflect-Refine’, Cycle.

There is an evident need as explained in Chapter 3 (Research Gap Analysis) for Service Design framework which can enable Service Designers to apply behaviour change principles in an integrative, actionable and participatory way throughout the Service Design life cycle.

As part of this step, different elements for logical and physical interconnected operations to inform the Service Design process were identified. As listed in section 7.1.2 (Process), all the service-design-process interventions points along with the list of behaviour change principles, Philip Kotler’s value equation and the CraftChange Behaviour Progression Model, deliberated together to come up with the list of the modules required for the framework as shown in Figure 46 and Figure 47.

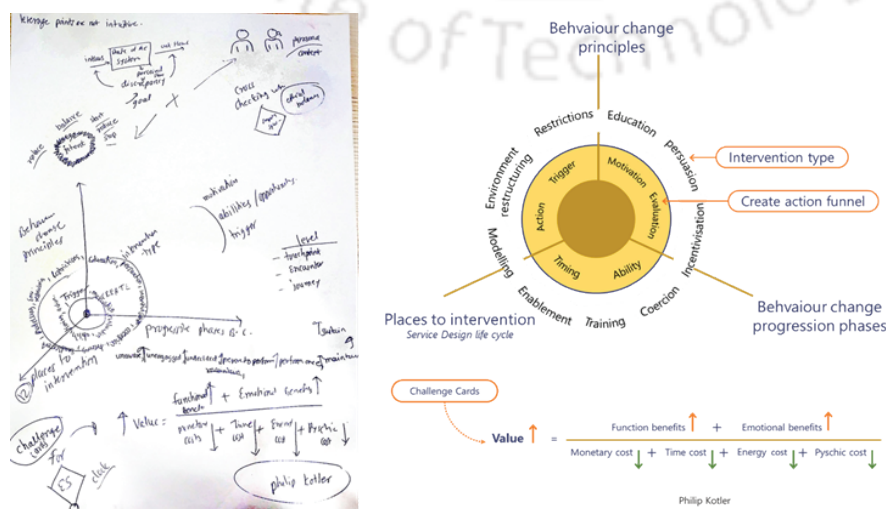


Figure 46: Initial Sample Sketch - 1



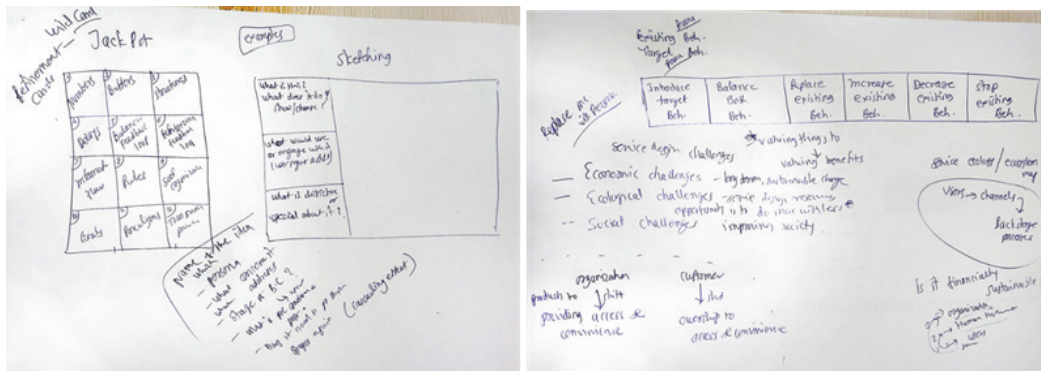


Figure 47: Initial Sample Sketch - 2

For the precedence of toolkits in this domain, the following tools kits were referred for inspirations.

- Precedence like Design with Intent Cards (Lockton, 2013), IDEO Method Cards (IDEO, 2019), Bridgeable Cards (Bridgeable, 2017), Creative design thinking toolkits (Kimbell, 2014), Business Model Canvas (Osterwalder & Pigneur, 2010) (Joyce & Paquin, 2016)
- Inspirations from multiplayer board games, Poker Playing Cards, sketching canvases, Business model canvases, play dice, role play, individual / group use

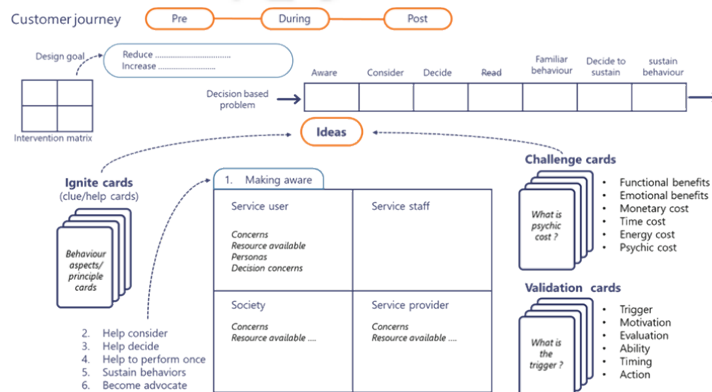
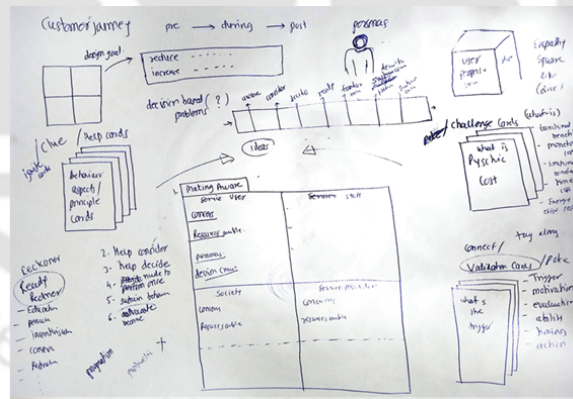


Figure 48: Initial Sample Sketch - 3

- Design guidance, Service Design principles and externalisation, distributed cognition concepts (Blomkvist & Segelström, 2014) (Nonaka, Takeuchi, & Umemoto, 1996) (Khambete, 2013)
- Gestalt principles of Design

As shown in Figure 48, the combination of cards and canvases were conceptualised by taking forward the initial sketches, as shown in Figure 46 and Figure 47.

Drawing inspiration from these alternatives, the Card and Canvas forms were further developed as explained in the following section.

7.2.2.1 Card Format

Wherever there is a need to provide design guidance to spur idea generation, the most popular form is packs of cards, or ideation decks (Golembewski & Selby, 2010) (Golembewski, 2010). Though currently, the card-based tools are relatively common in creative practice, this was not always the case previously (Golembewski, 2010). The format seems to become widespread and common in design following the publication of IDEO Method Cards (IDEO, 2019), which is a set of 51 cards explaining methods to use during the design process. The origin of the ‘card deck’ format in playing cards suggests their use as part of an ‘idea generation’ game (Lockton, 2013). Following are a few examples of Cards used in the Design field.

- Design with Intent Cards (Lockton, 2013)
- IDEO Method Cards (IDEO, 2019)
- Bridgeable Cards (Bridgeable, 2017)
- User Experience Trading Cards (nForm, 2003)
- Working Through Screens Idea Cards (Burghardt, 2009)
- The at-one Customer Experience Touchpoint Cards (Han, 2010b)
- UX Story Cards (Quesenberg & Brook, 2010)
- Biomimicry Card Deck (Volstad and Bok, 2008)
- Recommendations for Usability in Practice (Van Kuijk, 2010)
- ID Cards (Evans & Pei, 2010)
- The Social Innovation Lab Kent (SILK) Method Deck (Kent, 2010)

Other card collections are as follows:

- Design Council’s Agenda cards (2005)
- Research in Practice for Adults’ Change Cards (2010)
- Marshall McLuhan’s Distant Early Warning cards (1969)
- Brian Eno and Peter Schmidt’s Oblique Strategies (1975)
- Arup’s Drivers of Change (2009)



Looking at these cards from design and other fields, it seems a card format offers the following benefits:

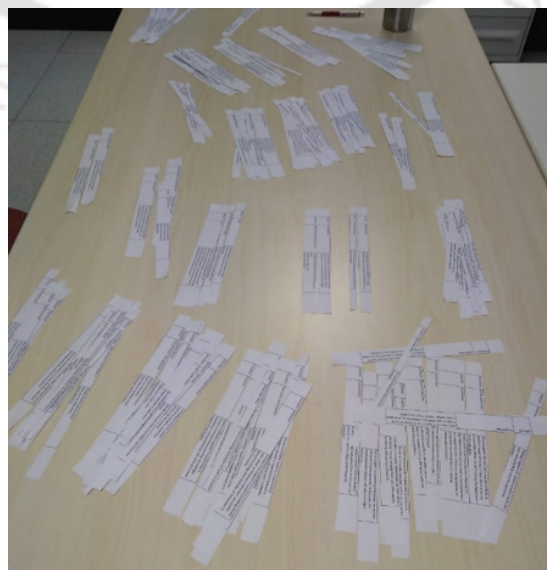
- The affordances provided by the discrete nature of individual cards
- Easy to provide the default categorisation with visual clues
- Provides the flexibility of grouping it in different ways depending upon the context
- Can be shuffled, re-ordered and spread among a group of people to take care of participatory and multidisciplinary nature of the design process
- Can provide a 'consistent' format for the behaviour change principles
- Individual cards can be converted into touchpoints seeking further information
- Can eliminate technology dependency and make it more accessible

Despite having so many advantages, the Card form comes with its disadvantages such as:

- Being inherently unstructured even divided into 'suits' or categories
- not naturally retaining an order or an apparent flow from one to the next (it can be even used to the advantage to foster creativity by not forcing stringent processes)
- being difficult to keep track of whether all the cards are consumed
- having too many cards may be overwhelming

7.2.2.2 CraftChange Toolkit – Cards Version 0.1 to 0.3

Toolkit versions (AFo.1, AFo.2 and AFo.3) are iterative sketches on paper and in PowerPoint before coming up with the printable version of the CraftChange Toolkit AFo.4



Clustered various Elements of Behavior Change models and Framework resulting in Ready Reckoner, Challenge and Tag-Along Cards. Listed Behaviour Change Principles and Clustered them resulting in Ignite Cards, as shown in Figure 49.

The CraftChange Toolkit Cards (refer to Figure 50) are as follows:

- **Ready Reckoner Cards** are inspired by Behaviour Change Wheel - Susan Michie (Michie, 2014) and design practice.
- **Challenge Cards** are inspired by the value equation of Philip Kotler (Kotler, 2000), EAST framework and sustainability principles (Behavioural Insights Team, 2014).
- **Tag-Along Cards** are inspired by CREATE Action Funnel (Wendel, 2013), EAST framework and design practice (Behavioural Insights Team, 2014).
- **Ignite Cards** for ideation are adapted from various behaviour change principles, Design with Intent Cards (Lockton, 2013), IDEO Method Cards (IDEO, 2019), Bridgeable Cards (Bridgeable, 2017). Ignite Cards are not the primary and original contribution of this CraftChange Framework; people are open to using any other cards related to behaviour change principles such as Bridgeable (Bridgeable, 2017). The researcher created the Ignite Cards as the collection of behaviour change principles to assess the CraftChange Framework. The behaviour change principles are the contributions of the original authors and researchers. As part of the CraftChange, the Ignite Cards reframed behaviour change principles to make them actionable and easy to understand with relevant examples.



7.2.2.3 Canvas Format

A handbook ‘*Business Model Generation*’ (Osterwalder & Pigneur, 2010), is a practical guide to understanding and creating business models. The ‘*Business Model Canvas*’ from this book allows users to focus on each of the ‘*building blocks*’ of business models.

In general, it is observed that the nature of a Canvas helps to structure discussions. The canvases, along with the embedded building blocks guide brainstorming during workshops. It enables grouping of information such as comments and ideas wherever applicable. In the case of the ‘*Business Model Canvas*’, it has helped to expedite the process by supporting a lean approach meeting the business expectations. The Canvas format makes it easier to develop multiple versions of anything intended, for example, ideas, business plans and quickly weed out bad ideas or outcome, if appropriately structured. Canvases are supposed to intuitively make sense and hence are kept in their purest form. The researcher finds it helpful in quickly clarifying thinking on the embedded model. If done correctly, one building block naturally leads to the next. The Canvas format forces its user to think deeply about the building blocks they are presenting.

Visually representing an underlying model or framework through a well-designed Canvas can support developing and communicating a more holistic and integrated view supporting creative thinking. A Canvas helps to integrate multiple perspectives. In conclusion, a Canvas format is a practical and easy-to-use tool which supports creatively developing, visualising, and communicating the underlying model or framework with more productive discussion and more creative exploration.

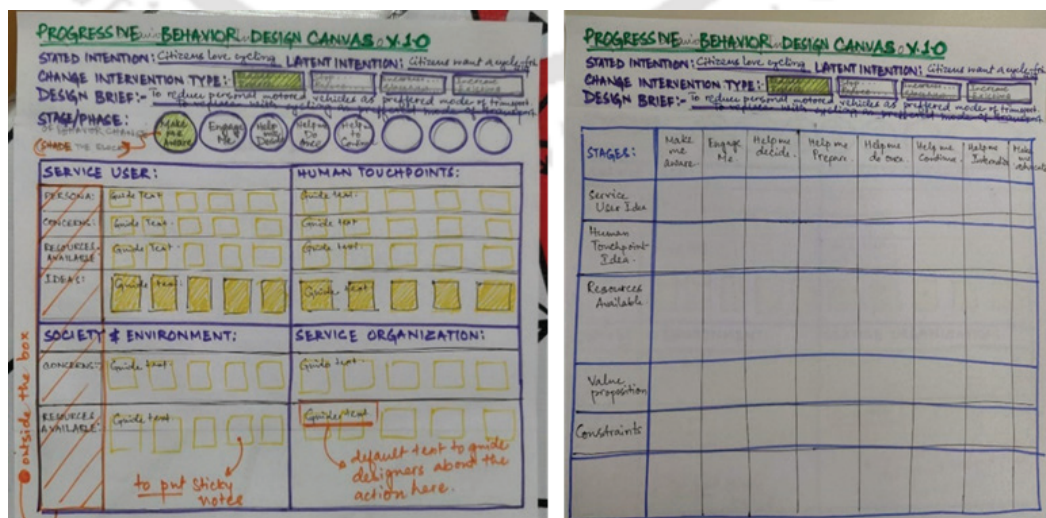


Figure 51: AFo.2 – Ideation Canvas and Idea Interlink Canvas

Considering the usefulness and effectiveness of the Canvases such as ‘Business Model Canvas and the benefits listed above, it is possible to imagine something like making the CraftChange Knowledge Framework actionable along with the Cards. It seems sensible to consider the use of cards and Canvas as a possible format for the CraftChange Toolkit, alongside other formats, enabling a wide range of possible use-cases.

7.2.2.4 CraftChange Toolkit – Canvas Version 0.1 to 0.2

The CraftChange Knowledge Framework operationalised through various Canvases corresponding to the identified intervention points, as shown in Figure 48. The CraftChange Toolkit started with two canvases namely the Ideation Canvas and Interlink Canvas as shown in Figure 51.

7.2.2.5 Summative assessment of CraftChange Toolkit Version 0.2

The self-reflection method involves a person thinking aloud while performing a set of specified tasks. The researcher found the self-reflection method very useful to assess the initial version of the CraftChange Toolkit. As explained in section (5.3- Assessment of Knowledge Framework), self-reflection is useful to find the gap between the theory and practice, between the tacit and explicit knowledge.

The Reverse Mapping Case Studies were used to assess the CraftChange Knowledge Framework (Chapter 5 - 5.3.1 Reverse Case Study Mapping – Pune Cycling Plan and 5.3.2 Water Pouches). They simulated the complete Service Design scenario using

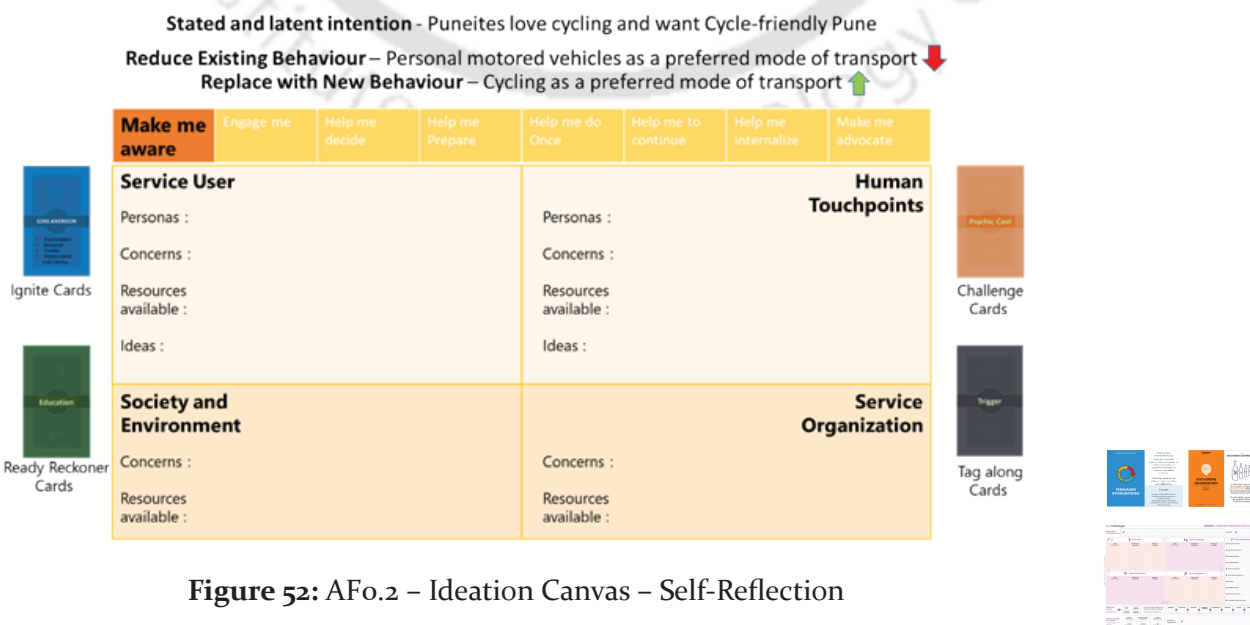


Figure 52: AFo.2 – Ideation Canvas – Self-Reflection

Stated and latent intention - Citizens love cycling and want Cycle-friendly City

Reduce Existing Behaviour – Personal motored vehicles as a preferred mode of transport ↓

Replace with New Behaviour – Cycling as a preferred mode of transport ↑

	Make me aware	Engage me	Help me decide	Help me Prepare	Enable me to perform Once	Encourage me to continue	Help me to internalize	Motivate me to advocate
Service User Ideas:								
Human Touchpoints Ideas:								
Resources Available:								

Figure 53: AFo.2 – Idea Interlink Canvas – Self-Reflection

the Toolkit for the case study, as shown in Figure 52 and Figure 53. They included looking at cards and canvases, thinking about each element, doing it for those two case studies, and reflecting. They helped to get insight into the cognitive processes as well as helped to find out the gaps in terms of completeness of elements mentioned, clarity of the content and usability improvements. During these exercises, the researcher’s industry experience played a crucial role in identifying the gaps and refining the Toolkit iteratively.

After addressing the identified issues such as content clarity, layouts and usability issues, the CraftChange Toolkit AFo.3 was ready for trials as part of a formative case study in the real setting.

7.2.2.6 CraftChange Toolkit Version 0.3

The external representation of a design solution is to communicate that the solution is ready for use. Figure 54 showcases the printable version of the canvases and cards that are parts of the CraftChange Toolkit. Cards were printed on A5 size paper and then folded horizontally. Both the canvases were printed on A1 size paper.

7.2.3 Analysis and Evaluation – Observe and Reflect

The analysis is about deriving behaviour from the design solution, prototype testing, human reasoning. The evaluation is about assessing the design solution based on the formulated criteria. In most cases, changes are needed that lead to further cycles of synthesis, analysis and evaluation. It is part of the overall research methodology’s ‘Observe and Reflect’ phase.



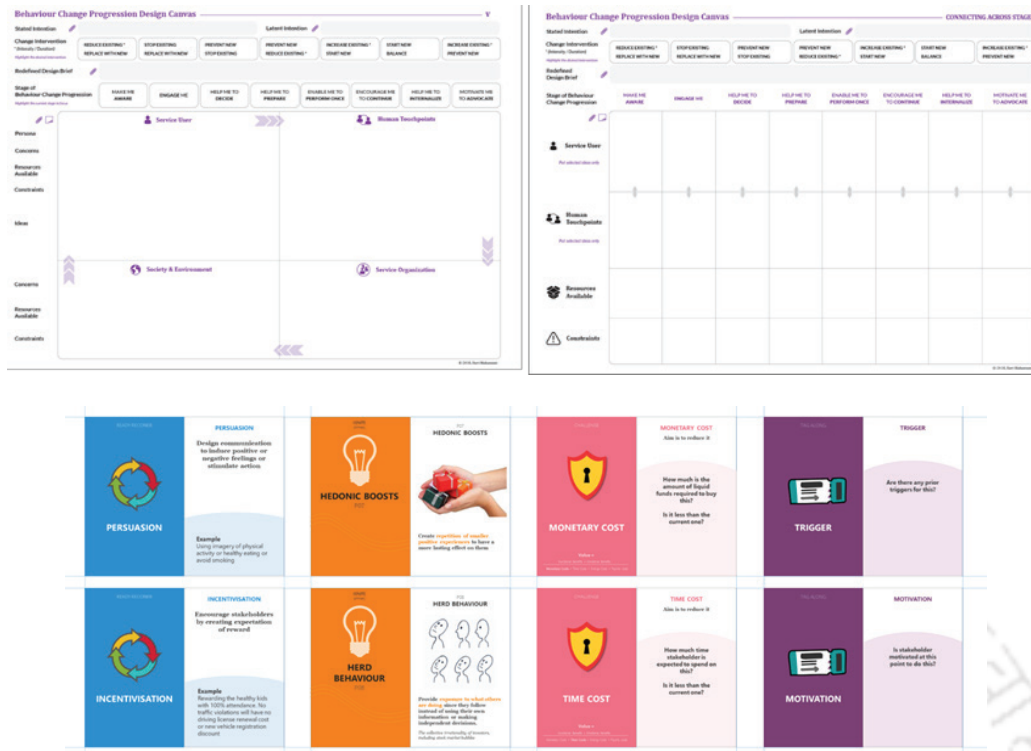


Figure 54: CraftChange Toolkit Vo.3

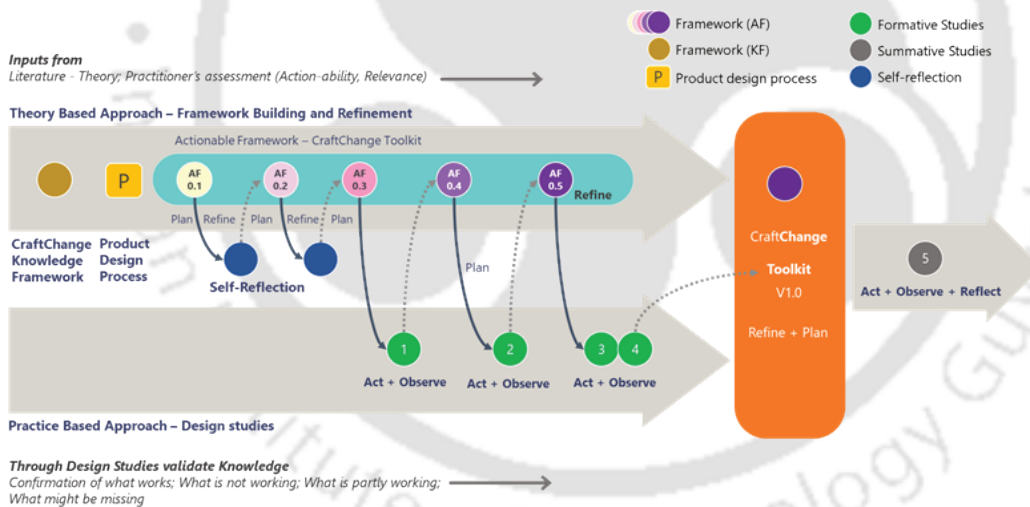


Figure 55: CraftChange Toolkit – Evolution

The realised actionable guidance of the CraftChange Framework i.e. the CraftChange Toolkit is composed of artefacts such as canvases and cards, and the process of using these artefacts in the Service Design life cycle. This CraftChange Toolkit was developed and evaluated through four formative studies and one summative study. The details of all five studies are as shown in Figure 55 and Chart 13 and elaborated in Chapter 8 (Assessment of CraftChange Toolkit). It helped Service Designers while facilitating the progression towards sustained behaviour change for the greater good.



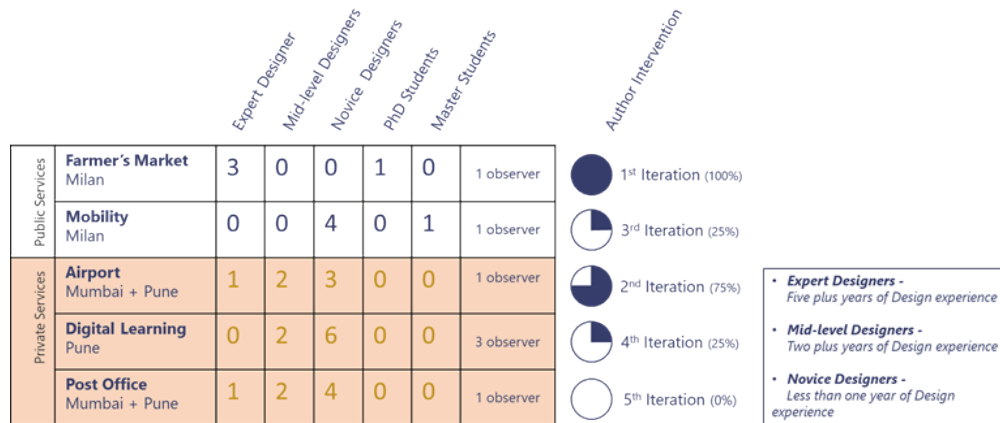


Chart 13: CraftChange Toolkit – Assessment Summary

After five cycles of ‘Plan research activities → Act as planned → Observe during activities → Reflect on the observations → Refine and repeat the cycle’ following the CraftChange change framework is available for Service Designers to influence the stakeholders’ behaviour in a sustained manner.

7.3 CraftChange Process - Actionable Guidance

This section is a continuation of the section 6.1.2 (Process – CraftChange Process) after the toolkit development. Once the toolkit consisting of various Canvases and cards is developed, it was required to evaluate the impact of the toolkit on the process and incorporate the toolkit into the process appropriately. As shown in Figure 43, the process and toolkit influence each other’s content, and hence it needs a few iterations.

The CraftChange Framework is currently envisaged for the Service Design projects aimed at facilitating sustained behaviour change. The CraftChange Framework is most useful for the Service Design projects where the design brief includes:

- Explicit behaviour change perspective, or
- When the design brief indicates the role of stakeholder behaviour to achieve the intended goal, or
- Where user research indicates the role of stakeholder behaviour in achieving the business goal



The philosophical foundation is an adaption from well-established methods like soft system methodology (SSM). It is used for general problem solving and in the management of change. The SSM is useful in the analysis of complex situations where

there are divergent views about the definition of the problem. These situations are ‘soft problems’ such as - how to improve health services delivery? In such situations, the soft systems approach uses the notion of a ‘system’ as an enquiring device that will enable debate amongst concerned parties. It consists of seven steps, with ‘an initial appreciation of the problem situation leading to the modelling of several human activity systems that might be thought relevant to the problem situation’ (Checkland, 1981).

As shown in Figure 56, the proposed process starts with understanding the design brief and then conducting the primary and secondary user research. This user research will help to reframe the design brief, understand the current behaviour and determine the target behaviour. After explicitly identifying the current and target behaviour, the service designer will refer to the Intervention Matrix to understand which quadrant this behaviour change belongs to and will provide high-level guidance about what to do. Then the service designer will map it to the progression graph and understand what path this behaviour change is going to follow, considering the given contextual constraints.

Then the service designer will refer to the behaviour change model and come up with the design strategies, design guidance and then execution guidance for each stage for the given behaviour change. Then the service designer will validate the prototype iteratively with the stakeholders and then rollout the interventions. Interventions can be of five types such as policy changes, process changes, service constellation, interaction and service-scope.

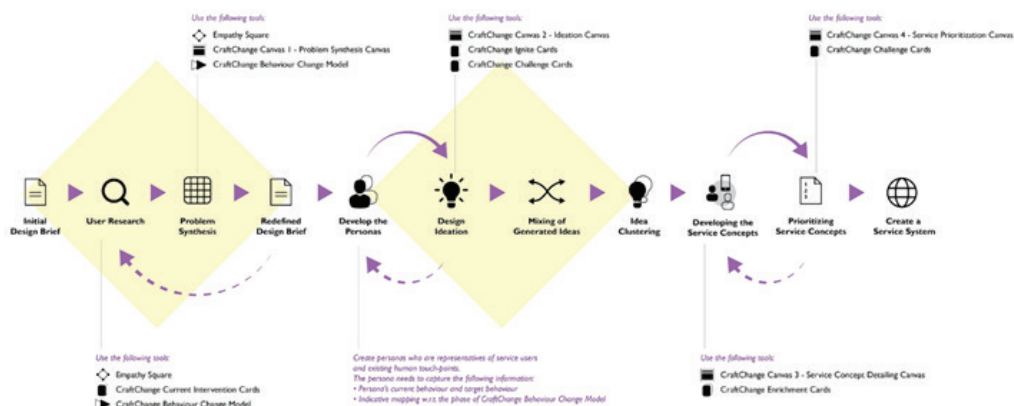


Figure 56: CraftChange Process V1.0



7.4 Chapter Conclusion

Considering the Service Designer's perspective, it helped to add the Service Design-specific clarity and how to make the CraftChange Knowledge Framework actionable. It was an iterative process in line with the overall research methodology and based on the product development process. The CraftChange Toolkit evolved as various kinds of cards and canvases. The initial assessment of the Toolkit was done through the self-reflection method using the case studies from the Reverse Case Study Mapping exercise of the Knowledge Framework. The next Chapter describes the assessment studies to find the usefulness, completeness and effectiveness of the CraftChange Toolkit using the *'Plan-Act-Observe-Reflect-Refine'* cycles



8 Assessment of CraftChange Toolkit

In this Chapter, we undertake an overall assessment of the CraftChange Toolkit by considering the iterations that are mainly aimed at assessing the usefulness, effectiveness and completeness of the CraftChange Framework, including the CraftChange Toolkit. The CraftChange Framework assessment methodology is explained in Chapter 4 – Framework Assessment section. For quick reference, the definitions of the assessment focus are repeated here.

- (U) Usefulness: The usefulness of the framework hints its utility in achieving the intended goal in real-life applications
- (E) Effectiveness: The effectiveness of the framework hints its adequacy to accomplish a purpose in real-life applications by influencing the key factors in an intended way
- (C) Completeness: The completeness of the framework hints its entirety in terms of required components with internal consistency

Reformulation type 1, type2 and type3, i.e. '*reflect and refine*' are part of the '*Plan-Act-Observe-Reflect-Refine*' cycle as explained in Chapter 4 (Research Methodology).

8.1 Iteration 3 – Formative Study 1

As described in Chapter 4 (Research Methodology), Formative Studies were planned with a specific focus on feedback which indicates the existence of a '*gap*' against the stated function and behaviour of the CraftChange Toolkit as shown in section 6.2.1 (formulation). The formative study covers all stages of the '*Plan-Act-Observe-Reflect-Refine*' cycle.

8.1.1 Plan

The objective of the study was ‘How to encourage Milan citizens to visit the Farmer’s market regularly’.

8.1.1.1 Background

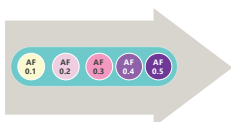
Sustainable development requires an integrative approach for activities related to the economic, environmental, and social context. People behaviour needs to be maintained for a long time to achieve sustainability. It is now widely accepted that Service Design by nature is holistic and integrative and can help in this cause. As designers, there is an opportunity to influence human behaviour. Despite the opportunity and the existence of multiple behaviour change theories, operational guidance may be created for designers to implement these behaviour change principles. The hypothesis is that the CraftChange Toolkit addresses this gap with multiple cards and canvases to help designers utilise the existing behaviour change principles. This Toolkit is supposed to provide the progressive path from being unaware of the change to becoming an advocate of change while balancing the ethical dilemmas on the way

8.1.1.2 Act

To validate the above hypothesis, a team at Politecnico Di Milano, applied the CraftChange Toolkit Vo.3 during a Service Design process within a specific local context: the Milan Earth Market. The Milan Earth Market is a farmers’ market providing local food while offering visitors vibrant and convivial experiences. It was observed that Milan residents are aware of this initiative, and most of them have already visited the farmer’s market at least once. There is a need to encourage the residents to make the farmer’s market as the first choice for their daily needs.



Figure 57: Iteration 3 – Formative Study 1



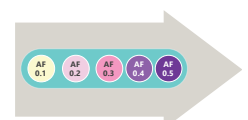
The team comprised three expert Service Designers who have authored multiple books on Service Design and are well-known in the Service Design field along with a senior PhD doctoral student (Service Design researcher). The team aimed at evaluating the usefulness of the CraftChange Toolkit within the mentioned context, without assessing the correctness and effectiveness of behaviour change theories, which were out of the scope of this exercise.

The researcher acted as an observer for this study and had full involvement during the two workshops of this exercise. Initially, the researcher explained the complete CraftChange Framework, including the CraftChange Toolkit. It was the first time where the CraftChange Toolkit was made available for use in a real setting. The session started on a good note since the expert team was already aware of the need for such a Toolkit and was able to see the direct applicability for the given problem. The researcher who acted as an observer clarified doubts during the workshops and made a note of all such queries. He observed the team during the action and noted the activities which were done efficiently and others that were complicated or confusing.

8.1.1.3 Observe

Following are the observations from the formative study¹ to improve the CraftChange Toolkit.

- (E) Confusion in separating concerns and constraints on Canvas-1
- (E) Difficulty in quickly identifying the Behaviour Change stage
- (E) Challenging to think from all four perspectives to start with
- (E) No need to repeat resources available on Canvas-2
- (C) Some Cards required a detailed explanation
- (C) Need to take care of sustainability perspective explicitly in Cards
- (C) Intervention categories from Ready Reckoner Cards can be used to understand the current context
- (C) Need a separate Canvas to detail out the ideas in a structured way



8.1.1.4 Reflect

After deliberation, the following refinements for CraftChange Toolkit Vo.3 were identified:

- Converted the redefined brief into specific current and target behaviours for simplicity and ease of use
- Added more instructions on canvases to remove confusion and complexity
- Refined the *Intervention Matrix* and added clarity for specifying change interventions. Reduced the number of options on Canvas 1
- Introduced the Current Context in Canvas 1 to encourage the use of Intervention categories during the User Research
- Canvas 2 – changed resources available to unutilised resources, constraints to unaddressed concerns and constraints
- Added Canvas 3 for idea detailing
- *Ignite Cards* – Primary and Secondary with improved details
- Renamed Ready Reckoner Cards as Current Intervention Cards
- Added Sustainability perspective in Challenge Cards

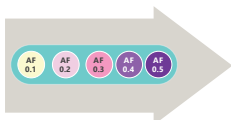
All these refinements were taken care of as a part of CraftChange Toolkit Vo.4 as illustrated in the next section.

8.1.1.5 Refine - CraftChange Toolkit Version 0.3

The following refinements were done in canvases and cards to come up with the CraftChange Toolkit version 0.4.

8.1.1.5.1 Craftchange – Current Intervention Cards

Most of the Service Design interventions for behaviour change have one thing in common, i.e. their objective can be accomplished only if the service users start performing new intended behaviours, for example, using public transport over personal vehicles, eating healthy food over junk food. Many of such designed interventions fail because of lack of knowledge about the existing context and

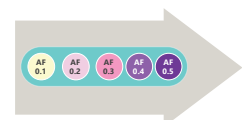


interventions are based on incorrect assumptions. It is very crucial while designing such interventions to understand why people do not practice the target, i.e. expected behaviours, but instead, opt for their existing routines. Understanding the factors and influencers that are preventing people from exhibiting the expected behaviours is vital to identifying the current barriers. These barriers need to be addressed during the Service Design life cycle for effective interventions. Addressing these barriers may help to save time and money and help prevent wasting resources and effort on ineffective interventions. Current Intervention Cards are designed to provide the much-needed know-how to understand people's behaviours and the related current context during the user research phase.

"Before you say how the things should be, first try to understand why they are as they are." - Tomalik, B. (July 2015) through e-mail communication. While understanding the current context, designers need to listen to the target population about their perspectives. Also, they need to look at the existing and expected behaviours from the target population viewpoint. Designers need to recognise that the target population knows themselves better than the Service Designer/s do. It is generally applicable for all primary user research activities, but it is very crucial while designing services for behaviour change.

The following are the 10 Current Intervention Cards, which were previously called *"Ready Reckoner Cards."*

- 1. Persuasive Interventions:** Look for existing, potent interventions to induce positive or negative feelings or trigger intended actions. Identify reasons for why or why not they are effective. (Example: Imagery of physical activity or healthy eating to promote a healthy lifestyle. Alarming imagery of railway accidents to prevent rail crossing and trespassing)
- 2. Incentivisation Interventions:** Look for existing means to encourage people by offering various kinds of rewards. Identify reasons for why or why not they are effective. (Example: Rewarding kids with 100% attendance in school. No traffic violations will be rewarded with a waiver in license renewal cost or a discount on vehicle registration)
- 3. Coercive Interventions:** Look for existing ways of punishment or impose an additional cost to discourage current behaviour. Identify reasons for why or why not they are effective. (Example: An abnormally high tax on personal vehicles or high public parking charges to promote public transport. Hefty fines for a traffic violation.)
- 4. Training Interventions:** Look for existing means to increase the abilities of people by imparting training. Identify reasons for why or why not they are



effective. (Example: Training for truck drivers on defensive driving strategies to avoid collisions and traffic violations.)

5. Restrictive Interventions: Look for existing rules and regulations to discourage current behaviour and to encourage target behaviour. Identify reasons for why or why not they are effective. (Example: Prohibition on sales of toxic substances to people under 18 and even no such shops should be allowed in the vicinity of schools and colleges. No two-wheelers allowed on expressways.)

6. Physical Aspects of Environment: Look for existing service-scape that discourages undesired behaviour or encourages target behaviour. Identify reasons for why or why not they are effective. (Example: Barricades to regulate two-way traffic. Separate arrival and departure gates at airport to manage vehicle and people flow.)

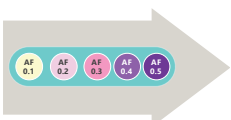
7. Role Model: Look for a living example for people to aspire to or imitate in pursuit of encouraging target behaviour. Identify reasons for why or why not they are effective. (Example: Cricketers promoting healthy lifestyle or Clean India campaign. Traffic safety campaign by film stars or superheroes.)

8. Enabling Interventions: Look for existing ways to increase means and reduce barriers to embrace behaviour change. Identify reasons for why or why not they are effective. (Example: Emotional support for smoking cessation, prominently accessible healthy food, availability of sugar substitutes. Safe lanes for cyclists and pedestrians.)

9. Educational Interventions: Look for existing ways to increase knowledge or understanding of current and target behaviour. Identify reasons for why or why not they are effective. (Example: Providing information to promote the use of helmets and seatbelts reduces the risk of severe and fatal injuries.)

10. Leveraging Networking Interventions: Look for how the Ecosystem is leveraging the networking of involved entities. Identify reasons for why or why not they are effective. (Example: The local farmers, community and small traders collectively promoting the local market. For better connectivity, synchronising the schedules of various transportation modes in the city.)

8.1.1.5.2 CraftChange – Challenge Cards



Following are the 10 Challenge Cards of CraftChange Vo.4, which includes the sustainability perspectives. The Cards related to Sustainability were derived from the following literature.

“In practice, sustainable development requires the integration of economic, environmental, and social objectives across sectors, territories, and generations. Therefore, sustainable development requires the elimination of fragmentation; that is, environmental, social, and economic concerns must be integrated throughout decision-making processes in order to move towards development that is truly sustainable.” -- Brief for GSDR 2015

It is evident from the above brief that environmental, social, and economic concerns must be addressed as part of the decision-making and hence while designing the Service Design interventions. Following definitions and quotes helped to understand what sustainability is and how can it be embedded in the Service Design process.

“A process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations” - The World Commission on Environment and Development

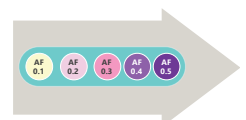
“Sustainable development is a dynamic process which enables people to realise their potential and improve their quality of life in ways which simultaneously protect and enhance the earth’s life support systems” (Forum for the Future)

“In essence sustainable development is about five key principles: quality of life; fairness and equity; participation and partnership; care for our environment and respect for ecological constraints - recognising there are ‘environmental limits’; and thought for the future and the precautionary principle”. (From Making London Work by Forum for the Future’s Sustainable Wealth London project)

“The environment must be protected... to preserve essential ecosystem functions and to provide for the wellbeing of future generations; environmental and economic policy must be integrated; the goal of policy should be an improvement in the overall quality of life, not just income growth; poverty must be ended and resources distributed more equally, and all sections of society must be involved in decision making”. (The Real World Coalition 1996, a definition based on the work of the World Commission on Environment and Development)

“We cannot just add sustainable development to our current list of things to do but must learn to integrate the concepts into everything that we do.” (The Dorset Education for Sustainability Network)

“A sustainable future is one in which a healthy environment, economic prosperity and social justice are pursued simultaneously to ensure the well-being and



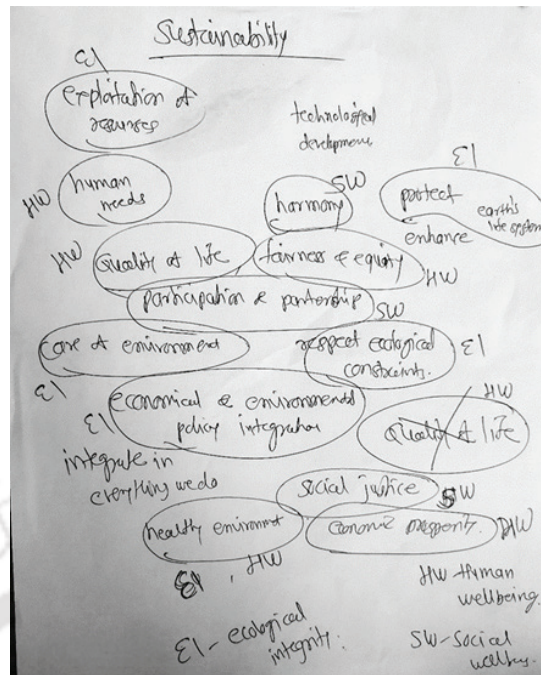


Figure 58: Clustering of Sustainability Concepts

quality of life of present and future generations. Education is crucial to attaining that future.” (Learning for a Sustainable Future - Teacher Centre)

“The first and perhaps most difficult problem, one that seldom gets addressed, is the time frame...Is a sustainable society one that endures for a decade, a human lifetime, or a thousand years?” (The shaky ground of Sustainable Development Donald Worster in Global Ecology 1993)

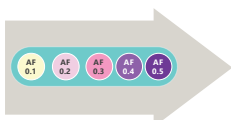
The keywords related to sustainability were drawn from the above definitions, and these were subsequently clustered, as shown in Figure 58. It was an open-ended clustering exercise in which key names were given to represent the contents of the cluster resulting in the following clusters.

Ecological Integrity - wise exploitation of resources, protect and enhance earth’s life support system, care of the environment, economic and environmental policy integration, respect ecological constraints, healthy environment

Human Wellbeing – Human needs, quality of life, fairness and equity, healthy environment, economic prosperity

Social Wellbeing – Harmony, participation and partnership, social justice

Other - Technological development, integrating into everything one does

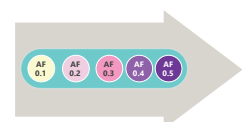


This clustering exercise helped to create the three challenge cards corresponding to each cluster except 'other'. The exercise aimed to encourage and trigger Service Designers about sustainability aspects. Following is the updated list of Challenge Cards.

1. **Functional Benefits:** Aim is to increase it. What are the tangible benefits to the persona?
2. **Emotional Benefits:** Aim is to increase it. How does this make the persona feel? Does it generate positive feelings?
3. **Human Wellbeing:** Aim is to increase it. Is persona's long term wellbeing considered? Economic, Social, Mental health and physical health.
4. **Social Wellbeing:** Aim is to increase it. Is social wellbeing looked after? Social justice, Moral obligations, Safe and secure communities, Diversity and Inclusiveness.
5. **Monetary Cost:** Aim is to reduce it. How much is the financial cost required to buy this? Is it less than the current one? Can the provider afford to give it at this cost?
6. **Time Cost:** Aim is to reduce it. How much time is the persona expected to spend on this? Is it less than the current one?
7. **Energy Cost:** Aim is to reduce it. How much effort is the persona expected to spend on this? Is it less than the current effort?
8. **Psychic Cost:** Aim is to reduce it. Is this going to add to the stress of having to think about it (and execute it)?
9. **Ecological Integrity:** Aim is to address the concerns of Biodiversity, climate change, conserving for future generations.
10. **Empathy Square:** Aim is to balance the concerns of all stakeholders considered? Is it a win-win for all stakeholders?

8.1.1.5.3 CraftChange – Enrichment Cards

Enrichment Cards are envisaged to guide the completeness of ideas from a behaviour change perspective. They provide a list of aspects that the idea must have to make it useful from the behaviour change and implementation perspectives. These Cards help to identify gaps to enrich the idea. Enrichment Cards are inspired by



AF Assessment

the CREATE Action Funnel (Wendel, 2013), EAST framework and design practice (Behavioural Insights Team, 2014). Previously the Enrichment cards were referred to as the Tag-Along Cards.

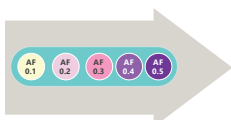
1. **Trigger:** Are there any prior triggers for this?
2. **Motivation:** Is the persona motivated at this point to do this?
3. **Information:** Does the persona have all the required information to evaluate and make an informed decision?
4. **Ability:** Is the persona capable of performing this? Are the environment and system ready for this?
5. **Timing:** Is this the right time for a persona to think and execute this?
6. **Reinforcing Action:** Is this a one-time or sustained action? Can it be recorded to encourage repeat actions?
7. **Five Senses:** Are the five senses, i.e. sight, smell, touch, taste and hearing considered?
8. **Realisation:** Are the following specification details identified - Policy Changes, Business process changes, Touch-points, Interactions, Physical aspects of environment?

8.2 Iteration 4 – Formative Study 2

8.2.1 Plan

The objective of the study was to create a stress-free and enjoyable Airport experience for passengers.

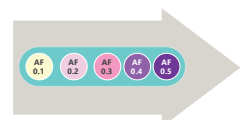
The airport-related case study was undertaken to evaluate the usefulness, effectiveness and completeness of the CraftChange Framework. The team was distributed across two locations. There were four people at one location and three people at another location. Out of the team of seven people, three people had the required domain knowledge to understand the given problem. One person at each location was assigned the role of an observer-cum-moderator. The researcher of the CraftChange Framework was not part of the teams. However, the team had the freedom to get in touch with the researcher at any time for showstopper doubts or discussion points. The plan was to conduct the whole study in one full-day session.



8.2.2 Act

Initially, the researcher gave the teams a walkthrough of the CraftChange Framework and the process of using it. Then the problem statement was discussed among the team members to build a better understanding of the problem at hand. These discussions happened while setting the stage (before actual ideation starts), where the intent, persona, current context were agreed upon. Many doubts were raised and clarified during this stage. The Observer-cum-moderator at each location played the role of guiding during the entire process and steps. All the observation notes, doubts/questions that the team was facing were carefully noted down. The ideation for each behaviour change phase was done using Canvas 1, and Primary and Secondary Ignite Cards. Challenging the ideas using challenge cards was also done in the same session. While challenging the ideas, it took considerable time as scoring was done for each of the ideas by using individual challenge cards. The timings, questions/doubts raised during the process were noted down to be discussed with the researcher before conducting the next session. Observers from both the locations noted down and combined all the doubts to be discussed. Doubts were then discussed and clarified with the researcher telephonically.

Following this, the second session started focusing on enriching and detailing out some of the ideas. The process of how to select the ideas for detailing was not very clear to the participants. During the team discussion, a few ideas were selected and divided between the teams to be detailed out by the team members at the two different locations. Detailing of the ideas was done offline by the two teams separately. Later these were discussed among all the team members to understand the process that they followed as the ideas that were detailed. Throughout the entire study, one document of all the observations was maintained and shared with the researcher.

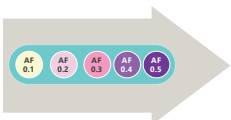


8.2.3 Observe

The following observations were made during this assignment:

- The initial phase of setting up the stage to understand, discuss, grasp and refine the given problem statement took considerable time.
- Actual ideation was done in a time-bound manner using primary and secondary Ignite Cards with very few critical questions/doubts during the ideation phase.
- Re-challenging the ideas took considerable time because the team members scored each of the ideas using each challenge card.
- It was felt that scoring of the ideas was not helpful nor required in the selection of more important or useful ideas for detailing out.
- Some challenge cards could not be applied to all the ideas.
- Sustainability cards, specifically those covering aspects of Social benefits, Human Benefits and Ecological integrity, were challenging to understand and apply to different ideas.
- There was confusion regarding whether the challenge cards were to be read from the service user's perspective or the service provider's perspective.
- All this (ideation and challenging) was done on the day 1- session 1 of 6 hours.
- Some of the ideas that came out were very specific with some details also mentioned, while some others were general.
- Some ideas were difficult to be categorised and segregated as an idea for a service user or service provider.
- Detailing of the ideas were kept open-ended.

The detailed ideas were already rich with information, and Enrichment Cards had just acted like a checklist to ensure if every aspect had been considered or not. There were some minor additions to some of the ideas based on the Enrichment Cards. It was suggested that Enrichment Cards could be placed just on the idea detailing Canvas for more attention and use.



8.2.4 Reflect

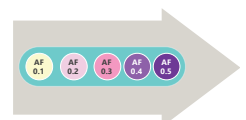
The researcher received the following feedback:

- (C) Need procedural instructions. The learning curve is demanding and high.
- (C) Process mapping should be done with standard Service Design
- (E) Need more space and time
- (E) Difficult ideating for a single phase
- (E) Unable to think from all four nodes perspective
- (E) The connection across various steps needed to be more prominent
- (E) Enrichment Cards did not lead to refinements as they were confusing to use
- (E) Cards needed additional detailed information

8.2.5 Refine - CraftChange Toolkit Version 0.5

After deliberation, the researcher identified and made the following refinements for the CraftChange Toolkit

- Added more instructions on Canvases from a novice user perspective
- Canvas2 – changed ‘unutilised resources’ to ‘resources required’, ‘unaddressed concerns and constraints’ to ‘Identified gaps’ in the Challenge Cards
- Canvas3 - separated Idea title and Idea description. Changed personas to actors, provided instructions and suggested a few specific Service Design tools
- Redesigned Ignite Cards with more relevant information
- Designed the detailed training agenda for the Service Design team



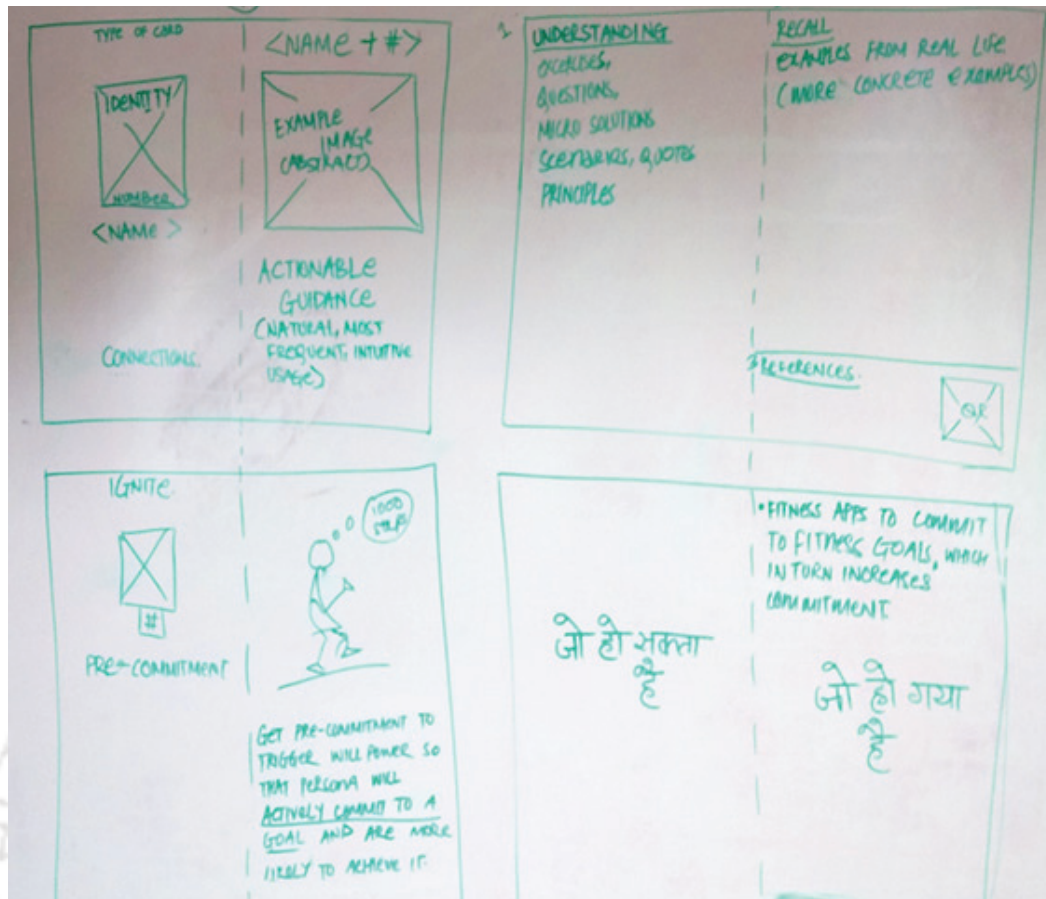


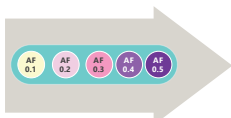
Figure 60: Redesigned Ignite Card Sample Sketch

8.3 Iteration 5 – Formative Study 3

A Masters' (MSc) program student of Product Service System Design, at Politecnico di Milano, used the CraftChange Framework and Toolkit Vo.5 as part of her Masters Thesis project. The topic of the Masters Thesis was "Creating a mobility service for Milan through design for behaviour change". Prof. Anna Meroni was the academic tutor of this project. The researcher acted as an observer and provided the necessary guidance throughout the project. The following section explains the use of the CraftChange Framework and Toolkit throughout the project. (Courtesy - Chantal Mhanna, Master Thesis, 2019).

8.3.1 Plan

Cities are risking too much pressure on their transportation infrastructure with the constant growth of travel demands. Urban mobility is changing and is trying to reduce using resources and improving the sustainability of its systems. As a consequence, multimodal travels and short-term levers like reaching out for public and shared transportations and encouraging walking and biking as inevitable options to ensure efficiency.



The goal of this thesis project was to encourage the ‘usership’ of public/shared transportation and reduce ownership of private vehicles by fostering walking as a transportation mode to relieve other modes and make cities more liveable.

8.3.2 Act

To start with, the student carried out initial desk research identifying some current global trends in the mobility sector. Following this, she conducted field research in Milan city to understand the target travellers, their mobility behaviour state, pain points, needs, and motivations. Soon after, she conducted an ideation workshop adopting a CraftChange Framework and Toolkit to design a mobility solution with sustained behaviour changes.

The outcome was ‘dotMilano’ a platform for travellers allowing a more personalised door to door experience where users can pre-plan travel while utilising the first and last mile in order to be more active and transform these into high points in the experience. Moreover, the platform connects active members allowing them to share their travels, making the city more walkable.

As part of the Discover phase, she conducted extensive blue-sky research in order to provide a mobility overview and some opportunity guidelines. It covered: what is mobility, its ecosystem, and what are the current market innovative solutions and prospects. The benchmark was set of the competitive environment and by identification of global trends from the data gathered during desk research.

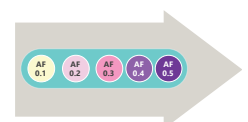
From the desk research conducted, case studies, and benchmarking, she tried to construct some guidelines that could, for the second phase, be used to define some opportunities and have some inspiration to use later on. Thereby, she suggested the following emerging global trends in the mobility sector. These were:

Mobility as a service

MaaS mobility as a service aimed at replacing personal vehicles with door-to-door journey offers. MaaS combines different actors, transportation providers (public and private) under one platform allowing to book quickly and manage travel while paying one single membership.

Multimodal travels

In an overcrowded and continuously expanding urban context, multimodal travels will become necessary to guarantee door-to-door mobility. Besides, multimodal travel will help travellers to have personalised, faster and more efficient journeys.



Real-time information

Smart services with an ecosystem connected in real-time where products (vehicles, sensors, street lights, smartphones, parking) through a network communicate and exchange data among each other.

Dynamic pricing

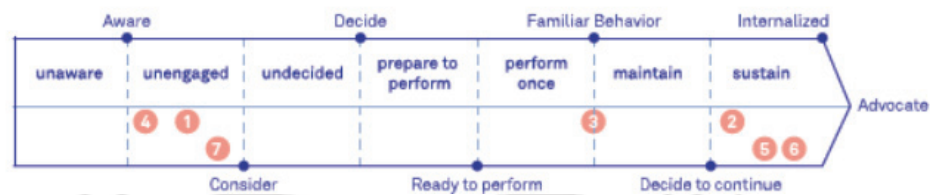
Prices are fluctuating based on different factors like time of day (rush or dead hours), road congestion, high demand and customer status.

Automation

Automation of vehicles; processes and services; time-saving and providing more safety. For instance, autonomous vehicles can maintain smooth traffic even with a reduced distance between them, thus increasing road capacity.

As part of the Define phase, the focus was on contextual research in Milan. It covered the current mobility context in the city. The qualitative field research and desk research focused on travellers and their travel experiences. The CraftChange Framework was adopted into the process and all the knowledge was applied for creating detailed personas and scenarios.

Taxi and travel network companies



Restriction

Private Vehicles are restricted from the center of Milan in certain hours (area C)
Expansion of the restricted zone by February 2019 (area B)

Modelling

Bike to work Initiative
Encouraging a team to use bikes and reduce the CO2 footprint

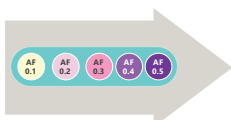


Figure 61: CraftChange - Use Customisation

Redefined Design Brief

How might one encourage Milan residents to use public and shared transportation in a sustained manner?

The objective of the user research was to understand the high and low points of travellers when it comes to their travel experience. Deduct the factors for good and bad travel experience and the reason behind them, travellers’ attitude, their behaviour state and in what stage they are when it comes to transportation modes and travel planners.



Figure 62: Iteration 5 – Formative Study 3

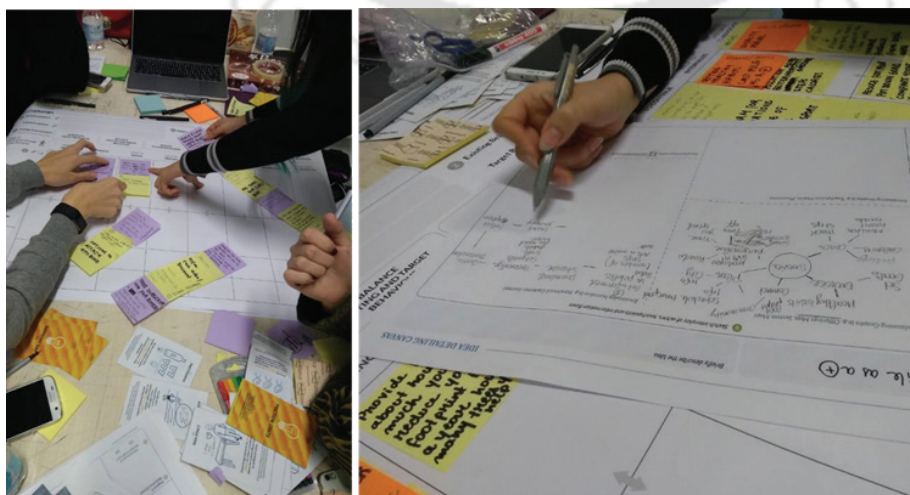
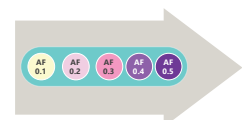


Figure 63: Iteration 5 – Formative Study 3 Action



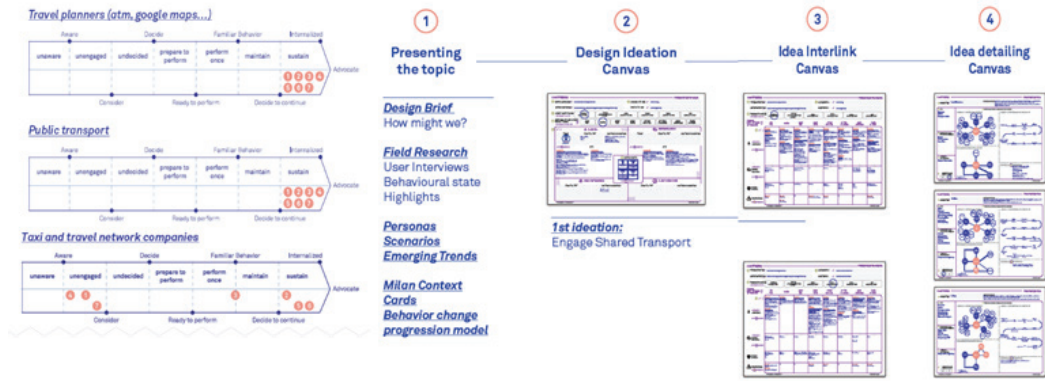


Figure 64: Iteration 5 – Formative Study 3 In Process Artefacts

The student mapped out the behaviour stages of travellers from the interviews conducted using the CraftChange behaviour progression model, as shown in Figure 61. Mapping behaviour stages of interviewees helped in understanding the interviewee stand towards every product/service. It helped to create a better view of where to intervene in a behaviour change.

The student created context cards on her own after the synthesis of the information she had collected as shown in Figure 61. After extracting insights from interviews and observations, she came up with three personas. She enriched the personas with behaviour aspects and embedded their travel modes concerning the CraftChange Behaviour progression model.

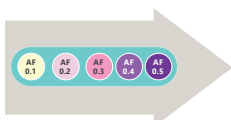
Ideate

As part of this phase, she applied the CraftChange Toolkit Vo.5 in the ideation session for creating a mobility service for travellers in Milan city. The student’s role in the workshop was as the lead Service Designer launching the topic, presenting the design brief, research and insights to kick off the ideation. Four designers participated, of which three were Service Designers, and one was a product designer. They were able to conduct two ideation sessions - one focusing on shared transportation and the other on public transportation - to later cluster and detail some ideas. In total, they generated 31 idea clusters and developed three detailed ideas.

8.3.3 Observe

The researcher received the following feedback:

- The learning curve needed separate time for understanding the framework.
- Difficulty in generating ideas in isolation for each phase of BC



- A few Ignite Cards needed additional information
- Subcategory of Ignite Cards is confusing (Primary, Secondary)
- Need more space, more time during idea generation
- Phase-wise Ideation slows down the process
- Idea interlink helped the free flow of ideas

8.3.4 Reflect

Following is the feedback from the Masters Student on her journey of using the CraftChange Framework and toolkit as well as the feedback from other participants.

[Usefulness]

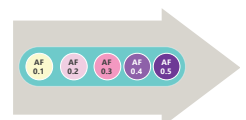
Adopting behaviour design methods and the CraftChange Toolkit were suitable for her topic because creating new services implies a change in users' behaviour. The support was a great way to ideate and confront each other as they created a context for a clear and focused brainstorming. However, the time taken to accommodate the use of the tools was a bit long. They felt the challenge and Enrichment Cards allowed them as a group to select the brightest ideas that they also felt can be the easiest to be adopted by final users, while they found that the Ignite Cards were useful to generate more ideas. Looking at the Idea Interlink Canvas, brainstorming was much faster during the second Canvas and more efficient, as it tended to help to look at different behaviour stages at the same time. It was easy and allowed to create more ideas and link the same ideas into different behaviour stages to make them stronger.

[Effectiveness]

“From time constraint (considerations) may be the tools need to be introduced to the other participants in a simplified way before the ideation to familiarise and not take time from the session.”

“While the use of Ignite Cards, as a tool was a bit confusing, especially with the subdivided categories, they were useful to generate more ideas. Having many cards made it difficult to focus on the ideation and not think about what the appropriate card is to link and apply into the topic.”

“On a personal level, I am not so sure about how suitable for this ideation workshop was it to use the design Ideation Canvas as it tended to slow down the



process. However, it was a good icebreaker for starting to work on the topic and a way to introduce the participant into the tools. It was interesting to look at one specific behaviour stage. However, for first-time users, it was a bit constraining the brain into a particular moment. I mainly felt that the 1st Canvas would be helpful to focus on a multi-actor situation where it can allow to think in an actor-centred way instead of only being human-centred.”

“I liked the idea of using Canvas because there were main points to think about, it was easier and faster than regular brainstorming”.

“The support was a great way to ideate and confront each other they created a context for a clear and focused brainstorming”.

“The challenge and Enrichment Cards (CraftChange – Enrichment Cards) allowed us as a group to select the clearest ideas that we also felt can be the easiest to be adopted by final users”.

“It (CraftChange – Ideation Canvas) was easy and allowed to create more ideas and link the same idea into different behaviour stages to make it stronger”.

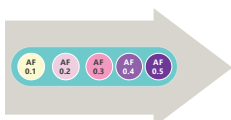
“The (ideation) workshop (using CraftChange – Canvases and Cards) is great. It is the first time me as a Service Designer to do such scheduled brainstorming section and also it is interesting because it all starts from changing users’ behaviour’s point of view”.

“The cards and supports were a huge help to ideate, identify directions and confront each other”.

“Yes, definitely (CraftChange Canvases and Cards are useful). It provides a new perspective; promoting a new service is actually changing user’s behaviour”.

“I really like the Idea Interlink Canvas (CraftChange - Ideation Canvas), that is the part that we actually start brainstorming, and I will prefer to have more space”.

“The design Ideation Canvas (CraftChange – Problem Space Synthesis Canvas) seemed really useful, the Idea Interlink Canvas (CraftChange - Ideation Canvas) was nice”.



Reflection on the above feedback and observations

- The learning curve, needs separate time for framework understanding

- Difficulty in generating ideas in isolation for each phase of BC
- A few Ignite Cards needed additional information
- Subcategory of Ignite Cards is confusing (Primary, Secondary)
- Need more space, more time during idea generation
- Phase-wise Ideation slows down the process
- Idea interlink helped the free flow of ideas

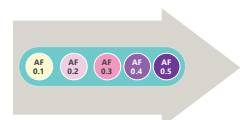
8.4 Iteration 6 – Formative Study 4

The following study (CraftChange: Behaviour Progression Framework – Evaluation In Quasi Participatory Design Setting, 2019) was published in the LeNS conference proceedings and the complete paper is available in the Appendix section (Appendix No - 10).

The team at one of the large IT companies in India, used the CraftChange Framework and Toolkit V0.5 in one of their Service Design case studies, aimed at encouraging the organisation employees working in a multi-cultural setting, to learn proactively and continually using digital environments and revamp their outlook towards learning. The underlying intention of the design activity was to empower employees of a multi-cultural globally spread large organisation, to enhance employees' productivity and performance by offering personalised and adaptive learning services.

8.4.1 Plan

User research was done by the designers and design researchers to understand the concerns, constraints and aspirations of employees about learning. The CraftChange Context Cards helped to identify the existing interventions and initiatives to review the learning support offered by the organisation. The critical concerns derived through the user research are: Despite much training and educational digital platforms being available for the employees to learn, individuals focused on learning only when they were required to in the job, learning at the organisation was more of a compliance to the organisation mandates rather than a proactive activity for gaining skills, the perceived importance of gaining domain knowledge was low among employees while they focussed on their existing areas of work expertise, time crunch during work hours was one of the distinct causes mentioned for not using the learning channels and platforms continually.



8.4.2 Act

The design activities were carried out in quasi-participatory (Mahamuni, Sharma, Lobo, Hiron, & Khambete, 2018) manner, where some of the activities such as, user research were done before the workshop by some of the participants. For the workshop, all the participants met together and got familiarised with the problem statement, Service Design and CraftChange Framework. Then they were divided into two teams, wherein the teams worked separately on solving the problem. After the workshop, participants individually or within small teams developed the service components further, with the possibilities of engaging again as and when required.

During the workshop aimed at ideation and creating solution service concepts, the two teams consisted of four and five members each from multiple professional backgrounds - psychology, information technology, designers and design researchers. Incidentally, all these team members could also be considered as future users of the service under consideration. One of the team members in each team played the role of the workshop facilitator. Facilitators also noted the observations during the workshop.

At the start of the workshop, an overview on Service Design was presented to both the teams together in order to make them acquainted with Service Design. The CraftChange Framework and the process were explained to the workshop participants. Further, the problem statement, the design brief and user research findings were discussed in detail. The team was then divided into two, ensuring trans-disciplinary participation in both the teams. The two teams simultaneously and separately used the CraftChange Ignite Cards and CraftChange Design Ideation Canvas to ideate under the guidance of facilitators.

The teams spelt out the stated intention and latent intention of the service users along with the current and target behaviour of the user using the CraftChange Intervention Matrix. The team mutually decided first to address the concerns of service users, i.e. employees and then focus on other stakeholders. The ideation was aimed towards identified employee target behaviour, i.e. to inculcate proactive and continual learning behaviour among the employees, while also balancing other stakeholders' needs and concerns. The teams were familiarised with the concise personas created earlier based on tacit knowledge (Mahamuni, et al., 2018) and refined with user research findings. The personas were – a bread earner persona from a rural background, a confident and young persona considering life over work, an enthusiast niche-skilled persona, a senior feeling monotony in his work and looking for a job or role change; identified through user research. The teams could choose one or many personas for the ideation.

For empowering the service user to progress from one state to another (as shown in

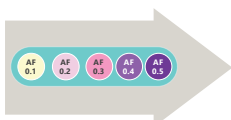


Figure 2), a round of ideation sessions was carried out using one set of CraftChange Ignite Cards. From the user research, it was known that chosen personas intend to learn as and when required for their work, but the learning is not continual and proactive. Team 1 considered the scenario where the persona knows about the various learning services and resources provided by the organisation and hence engaged in ideating for the subsequent progressive state of 'maintain'. Team 2 chose the scenario where the employee is unaware of the learning services and hence intended to be in the behavioural stage of 'unaware'. The CraftChange Ignite Cards were distributed within the teams to ideate for the given design brief. The Ignite Cards were used individually by the team members and ideas were drawn on sticky notes. The Ignite Cards passed on to other members within the team and ideation was repeated using the exchanged cards. While using the Ignite Cards, participants were encouraged to write their suggestions on improving the effectiveness of the content of the Ignite Cards.

At the end of the ideation phase, the feedback was collected from the participants to know the effectiveness of the ideation process and the role of the Ignite Cards. Participants appreciated the systematic ideation process and further proceeded with clustering of ideas. It was observed that though the teams initially focussed in ideating for the selected phase of the CraftChange Behaviour Change Progression Model, ideas were also generated for other phases.

Ideas were then scrutinised for gaps in their relevance to the given user context, persona behaviour, and the concerns and constraints in the purview of the other nodes of the Empathy Square. The use of CraftChange Challenge Cards helped to trigger the constructive discussion on the value of each idea and identify the gaps.



Figure 65: Iteration 6 – Formative Study 4

As a next step, the ideas were clustered based on their affinity to each other as a group exercise. Idea clusters like *'Learning with Partners'*, *'Learning Lab'*, and *'Intelligent Learning Content Design'* were valued to be innovative and practical, concerning the other clusters for the chosen scenarios. The CraftChange Enrichment Cards helped to find out the missing elements of the idea concept. It is very intriguing to see that the Enrichment Cards help to see the idea from various perspective to make it complete, but in a non-confrontational manner. It was observed that the team had a healthy discussion, and people immediately accepted the gaps and addressed them immediately in a few cases.

The selected idea clusters in both the teams were then detailed further using various Service Design techniques like offering maps, system map, touchpoint matrix, high-level blueprint and journey map. This detailing of the idea cluster helped to connect the discrete ideas as one component service.

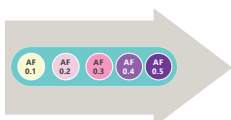
The specific component services were further refined to implicitly attend to the various concerns, constraints and available resources of all kinds of stakeholders involved in its implementation. It was observed that the various component services were connected to form a complete service.

8.4.3 Observe

Observations were noted by the facilitators of the two teams throughout the workshop. Oral feedback was also collected from the participants at intermediate stages of the workshop. The participants also made notes in pencil to provide feedback on the content of the cards in the toolkit.

The participants appreciated looking at the problem of continual learning from the lens of service, experience and behaviour change. Despite most of the team constitution being non-designers and non-Service Designers, they were able to effectively arrive at a promising number and quality of ideas through the guidance from the framework and tools. Sharing behaviour principles and concepts with the team helped trigger rich ideas. This, along with the framework and tools, facilitated the team to think across the mental states of the users, from being unaware to becoming advocate. The combined ideas generated by the two teams exceeded 100 ideas within around two hours. All the stages of the CraftChange behaviour progression model had enough ideas generated. The stages which had lesser ideas were revisited to add more ideas. The ideas generated were then clustered into three to five holistic and connected service concepts. Care was taken to revisit whether the ideas in the clusters were covered in the service concepts.

The Empathy Square was a useful construct towards balancing the concerns of the four stakeholders – the service users (employees), the support staff (HR, learning



departments, administration and other functions), the organisation, and where possible appreciating the environment and society.

In general, it was observed that teams were able to use the guidance from the suggested process or deviate from it whenever needed. Participants liked the approach towards the problem as a behaviour change problem. None of the ideas were discarded. All the ideas were clustered to create meaningful service components and detailed out to make it closer to a realisable state.

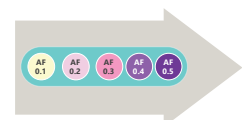
Participants who were not involved in user research took longer time to understand the problem context. The workshop had provided a short period to showcase the current problems and constraints as findings from the user research to sensitise the participants. However, it needs more time and discussion to have all participants contribute effectively sooner. It was observed that participants who were part of user research were more active initially during the workshop as compared to others. There was also a time crunch situation seen during the detailing ideas. Here, a quasi-participatory approach seemed useful, where certain activities are done by part of the teams before and after the workshop. Mainly, here the user research was done before the workshop. The service concept clusters were further detailed and refined after the workshop too.

8.4.4 Reflect

With the intent of evaluating the usefulness and effectiveness of the CraftChange Framework and CraftChange Toolkit, the team arrived at an effective Service Design solution to bring out the sustained change in employees' behaviour towards learning, such that they proactively and continually learn. The participants of the workshop found the guiding process, canvases and cards to be useful in ideating and carving out innovative solutions for a learning service. The toolkit of canvases and cards were useful to trigger and channelise many behaviours' change solutions.

The CraftChange Empathy Square guided to focus on addressing the concerns of not just the employees, but also the concerns of staff that would be involved in providing the learning service, the concerns of the organisations, and the society and environment.

The CraftChange Behaviour Progression Model provided a structured guidance to the participants to think of ideas progressing systematically from a specific mental state (*unawareness*) towards becoming sustained and internalised. Rather than thinking of the problem solutions from a high-level perspective, the participants could now arrive at solutions which systematically take the user across the stages, from '*unawareness*' (or other starting points) till '*sustenance*'. This approach was found to be systemically informing and guiding the design intentions and interventions to



achieve desirable behaviour change at the individual and organisational level.

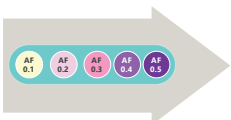
As the evaluation of the process, few minor issues were noted, such as communication challenges in the Canvas and content, facilitating time, and team engagement and dynamics. With these inputs, the team is in the process of evaluating the framework further by also applying it on a greater number of small scale as well as significant scale problems.

The following is a summary of the observations and feedback received from the team.

- [Effectiveness] Separation of problem space understanding and ideation
- [Effectiveness] Confusion on how to select the persona
- [Effectiveness] Difficulty in structured idea creation (phase-wise)
- [Usefulness] Separately noting ideas helped more than group discussion
- [Usefulness] Generating ideas inflow without transferring to the Canvas helped

Some of the issues were triangulated in both the iterations and were addressed as follows

- Added more instructions including which cards to use when on all Canvases
- Canvas 2 – changed unutilised resources to resources required, unaddressed concerns and constraints to gaps using challenge cards
- Canvas 3 - separated Idea title and idea description, changed personas to actors, provided instructions and suggested a few specific Service Design tools
- CraftChange – Problem Space Synthesis Canvas for problem space understanding and CraftChange – Ideation Canvas for ideation
- Separate training for Service Designers and Ideation workshop participants
- CraftChange Process modified to indicate explicit cycles for iterative design



8.5 Refine - CraftChange Toolkit Version 1

8.5.1 CraftChange - Service Design Process

The aim of the CraftChange Service Design Process is only an add-on process from a behaviour change perspective. It is not a prescriptive Service Design process. The add-on steps are suggested, keeping the required flexibility and without curbing creativity. The CraftChange Service Design Process subtly embeds the divergence and convergence stages of the design process. The CraftChange process retains positivity all along by suggesting the enrichment of ideas and concepts.

The overall focus is on value creation through such an additive and enriching process. By externalising and summarising at each progressive step, as one continues to develop the artefact, the process gives a sense of completeness after each stage. The strength of the CraftChange process is mainly focused on being actionable and making the behaviour science knowledge accessible to the Service Designers through the systematic use of various canvases and cards, as shown in Figure 66.

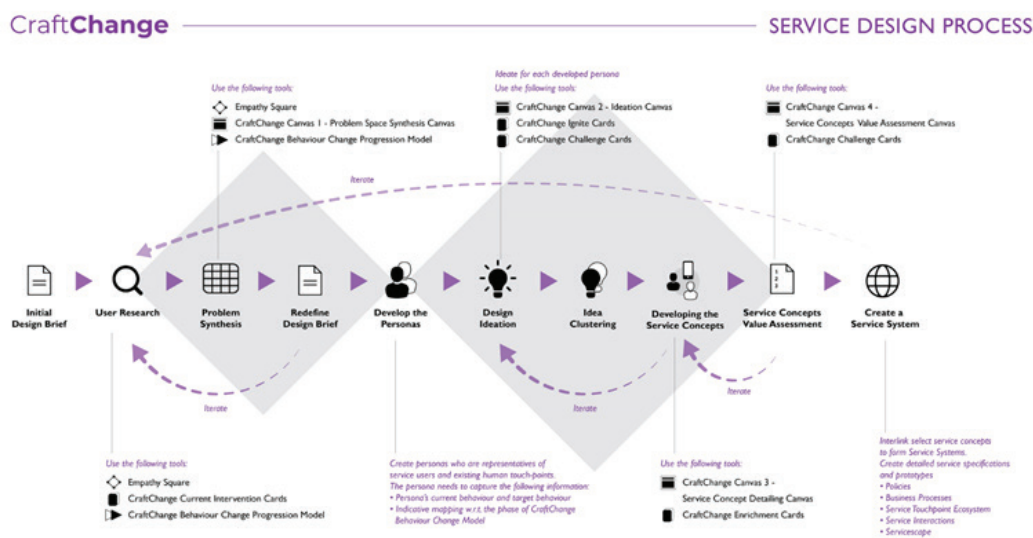
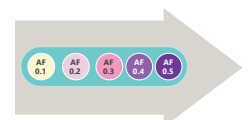


Figure 66: CraftChange Service Design Process V1.0



8.5.2 CraftChange – Problem Space Synthesis Canvas

It is being observed that there is a significant gap between intentions and the actual behaviour of people. An objective of Service Design is to enable people and provide triggers to take appropriate actions to achieve the goal through systematic, holistic design interventions in a progressive manner. Hence, it is critical to have an in-depth understanding of the problem space and have them summarised in the form which is accessible during the ideation phase.

The purpose of this canvas, as shown in Figure 67, is to capture the information gathered as part of the primary and secondary user research in a form that is easy to apprehend. After synthesising all the information from user research, one must revisit the initial design brief and if required, redefine it considering a renewed understanding of the problem space with the precise current and target behaviour. It is advised to refer to the CraftChange Intervention Matrix to get high-level guidance.

If the redefined brief requires additional user research, then designers may have to perform further user research.

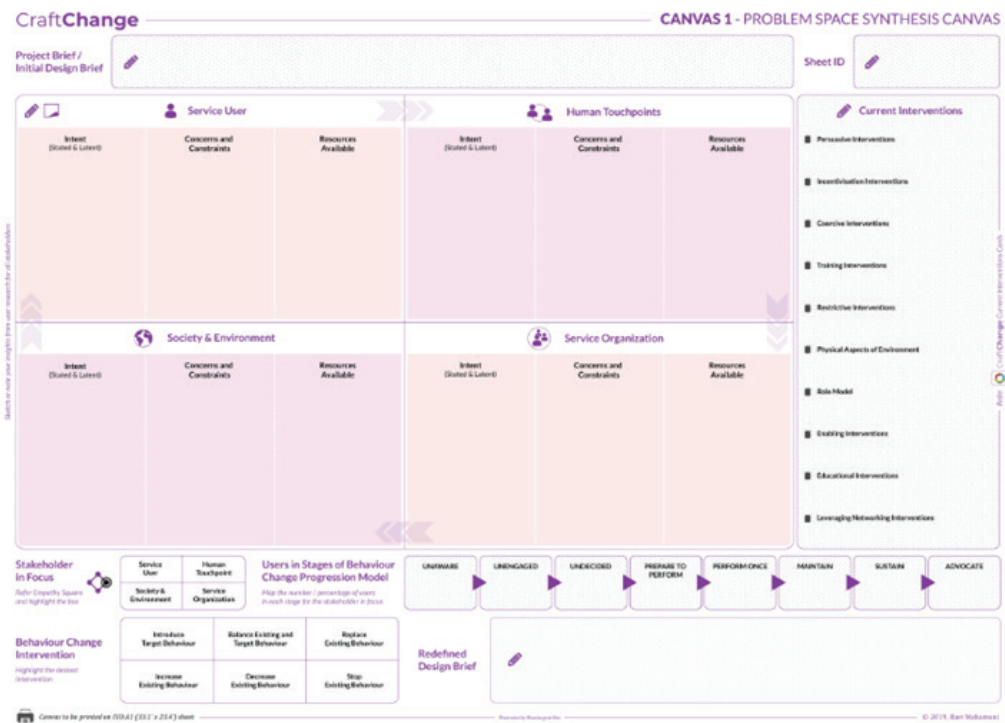
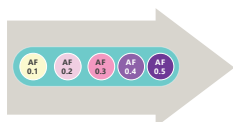


Figure 67: CraftChange – Problem Space Synthesis Canvas



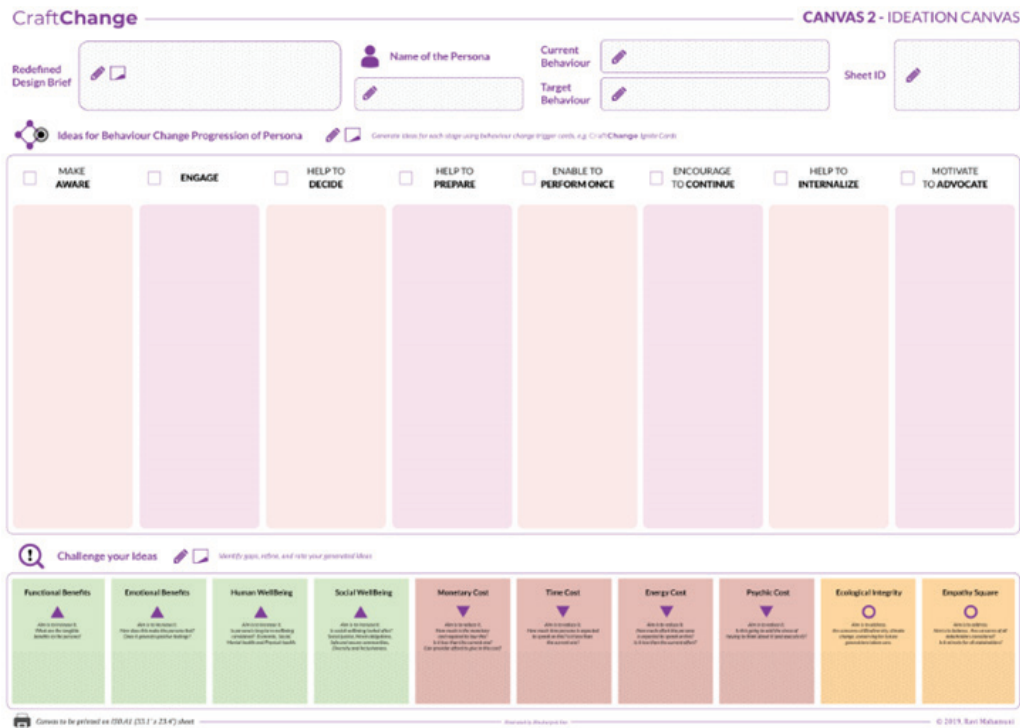


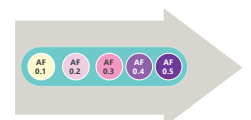
Figure 68: CraftChange - Ideation Canvas

8.5.3 CraftChange – Ideation Canvas

The Ideation Canvas is meant to orchestrate the ideation workshop, after getting clarity of the current context and personas are ready along with other in-process artefacts. The Ideation Canvas, as shown in Figure 68, provides the much-needed structure for the ideation session without curbing the creativity. It is suggested to generate ideas for each persona using the Ideation Canvas.

8.5.4 CraftChange – Service Concept Detailing Canvas

After ideation sessions for each persona, it is advisable to draw from all the ideas and create clusters, such that these could later be converted into service concepts. The clusters can be formed with logically coherent ideas from the concept or realisation perspectives. These idea clusters which are discrete in nature are discussed and converted into the service concept by describing the cluster in a few lines and providing them with a meaningful title. The newly formed service concept helps to think cohesively and identify the gaps and connections between various discrete ideas. These service concepts are individually detailed out using various Service Design tools, as shown in Figure 69. The Enrichment Cards help to identify the gaps for refinement from a behaviour change perspective. The designer may choose to refine the service concept or note down the gaps concerning each Enrichment card for future reference.



CraftChange **CANVAS 3 - SERVICE CONCEPT DETAILING CANVAS**

Service Concept Title Sheet ID

Briefly describe the Service Concept

Refer CraftChange Enrichment Cards to identify graphs and narratives, and identify gaps to further enrich these

TRIGGER Are there any pain triggers for this?	MOTIVATION Is the person motivated to do what you're doing?	INFORMATION Does someone have all required information to evaluate and make informed decision?	ABILITY Is person capable to combine their environment and/or system ready for this?	TIMING Is the right time for someone to think about or execute this?	REINFORCING ACTION Is this and more a natural behavior? Can it be reinforced through repeat or habit?	FIVE SENSES Are the senses (sight, smell, touch, taste and sound) considered?	REALIZATION Are the following user/behavioral characteristics of this? Policy Changes, Role Changes, Organizational Changes, Touchpoints, Interactions, Physical aspects of environment?
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Sketch interplay of actors, touchpoints and information flows

Enriching Graphs (e.g. Offerings Map, Systems Map)

Enriching Narrative (e.g. Storyboard, Customer Journey)

Enriching Graphs (e.g. Touchpoints Matrix, Budgets)

Concerns being Addressed / Constraints being Overcome Available to users of **Empathy Square**

Stage(s) of Behaviour Change being Addressed

Make Access	Engage	Help to Decide	Help to Perform
Enable to Perform Over	Encourage to Continue	Help to Innovate	Motivate to Absorb

Canvas to be printed on ISOA2 (210 x 297) sheet © 2015, Ravi Mahamuni

Figure 69: CraftChange - Service Concept Detailing Canvas

CraftChange **CANVAS 4 - SERVICE CONCEPT VALUE ASSESSMENT**

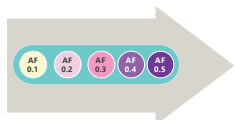
Redefined Design Brief Sheet ID

Challenge your idealized service concepts and compare with edge points on the basis of value generated. Scoring factors ▲ Low, ▲▲ Medium, ▲▲▲ High

Service Design Concepts	Functional Benefits ▲	Emotional Benefits ▲	Human WellBeing ▲	Social WellBeing ▲	Monetary Cost ▼	Time Cost ▼	Energy Cost ▼	Psychic Cost ▼	Ecological Integrity ○	Empathy Square ✓
	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▼▼▼	▼▼▼	▼▼▼	▼▼▼	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Systems & Environment
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Canvas to be printed on ISOA2 (210 x 297) sheet © 2015, Ravi Mahamuni

Figure 70: CraftChange – Service Concept Assessment Canvas



8.5.5 CraftChange – Service Concept Assessment Canvas

After detailing and using the enrichments cards for each service concept, the next logical step is to come out with the comparative value assessment of a service concept. It may be useful for progressive implementation, selections of service concepts, or to identify the need for further ideation. This canvas, as shown in Figure 70, enables the comparative value assessment using the challenge cards where the value judgment can be noted positively or negatively using the three-level scale (low, medium, high).

8.6 Iteration 7 – Summative Study 5

8.6.1 Plan

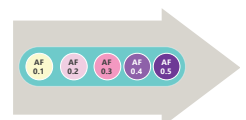
Case Study of Indian Postal Service

This case study was apt for the purpose, considering its intended service user base from the largest populated country, known for diversity across cultures, religions, language and economy. The case study aimed at designing new services for India Post and making those as the first choice for the citizen, in order to achieve greater adoption of India Post services and sustaining those for a more extended period. The team from a large IT organisation applied a combined approach of Service Design and behaviour change by using CraftChange Framework and Toolkit V1.0.

India is one of the largest populated countries with diversity across religion, culture, ethnicity and economy, designing services that are used by its huge citizen population was found to be the most suitable case for this research through a design project. India Post is currently facing challenges to fulfil user expectations, create self-sustaining solutions, widen the scope of usage of their services and be relevant in light of the fierce competition from the private players. In order to widen the adoption of India Post services and make it user's first choice, the team used the 'CraftChange' Framework and Toolkit V1.0 while looking at the problem from the lens of 'Service Design for behaviour change'.

8.6.2 Act

A vital aspect of this study was the adoption of the CraftChange Framework throughout the Service Design life cycle. The CraftChange Framework imbibes behavioural change progression of a user from the stage of unawareness to sustained usage of services, with various behavioural stages along the way. The framework provides a guided set of tools and techniques that allow Service Designers to imagine



new service models holistically by considering all the stakeholders that are affected within the service ecosystem. CraftChange was mainly used for making India Post services as citizen's first choice, increase the adoption of services to a greater extent and also sustain the services for a more extended period.

8.6.2.1 Case Study Secondary Research

The project commenced with gathering literature findings of India Post and its existing organisational and service eco-system to gain an overall understanding of the critical problems, as well as identify opportunities in the area. CraftChange Current Intervention Cards guided for what all additional information needs to be gathered from a behaviour change perspective.

A multi-disciplinary team of designers, engineers, researchers and psychologist collaborated to perform this study. The members of the team, being Indian citizens, were also users of the India Post service. The team members represented different geographies (North, North-East, West) and respective cultures of India. Tacit knowledge of the multi-cultural team about India Post and its usage in their own culture helped in gathering richer data. Primary research was conducted by a mix of quantitative and qualitative methods. The methods were chosen based on focus areas defined, which are explained further. The participant recruitment for the study was a mix of various age groups, gender and locations to get myriad views leading to further data triangulation.

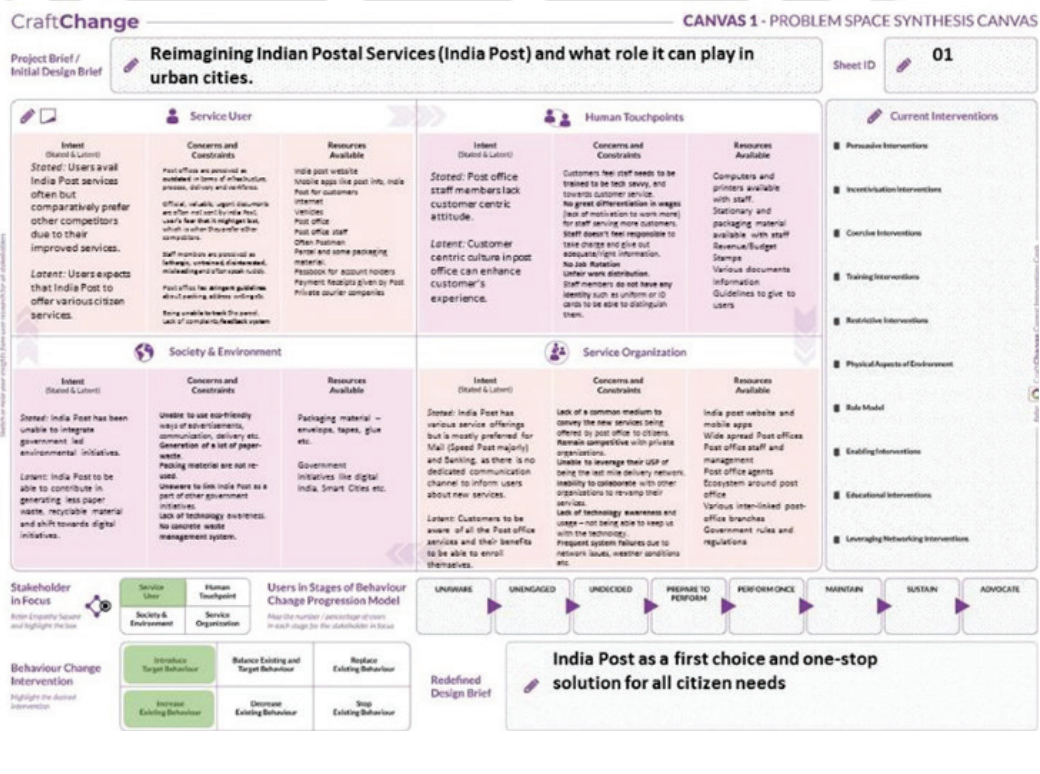


Figure 71: CraftChange Framework Canvas 1 – Problem Synthesis Canvas

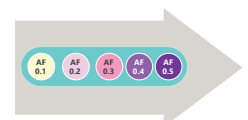
Current Intervention Cards (for instance, Training Interventions) of the CraftChange Framework were used to build the protocols for semi-structured interviews (for example, consideration of dimensions such as customer-centric attitude of post staff, efficiency of post staff with modern technologies, concerning Training Interventions card) and observations to understand the existing behaviour of people and the related current context. It helped in gathering all the necessary information to understand the existing services and current context.

8.6.2.2 Ideation and Prototyping

The design brief was defined as *'To design and facilitate Invitation Management Service by India Post as the first choice of Indian citizens'*. Making India Post's services used by most citizens today cannot be achieved by merely enhancing existing India Post services or introducing new services, but it also requires careful consideration of behaviours of diverse citizens as users of the service, such that they start using the services, use those for a more extended period and over time, also promote the use of those services. This way, newly proposed services can sustain for a more extended period. The team used the CraftChange Framework in order to make Indian citizens aware of the new invitation management service, engage them with the service, enable them to use the service, and sustain its use over some time such that they also advocate the usage of the service. The CraftChange Framework enabled the design team to understand the current context, ideate for each behaviour change phase proposed in the framework, cluster the ideas and create detailed service concepts.

Using the framework, the team started ideating for each phase of behaviour change using CraftChange Ignite Cards used to evoke the ideas based on behavioural principles. All the user research findings were placed on the first canvas, i.e. CraftChange Problem Space Synthesis Canvas in forms such as design brief, persona, CraftChange Current Intervention Cards which helped keep track of any gaps during idea detailing. These ideas were then clustered, and the clusters were challenged using CraftChange Challenge Cards in order to refine the ideas if those were not addressing the concerns of multiple involved stakeholders. Detailed service concepts were then created in the form of offering maps and blueprints. Service blueprints were created by following the graphical representations and annotations suggested in order to depict granular, inter-connected, repeating, multi-channel interactions involved. CraftChange Enrichment Cards were used at this stage to identify any missing pieces in the proposed services from a behaviour change perspective and fill those gaps.

The CraftChange Empathy Square guided the team to create a balanced solution addressing the concerns of users of the service, i.e. host and guests of the wedding, human touchpoints, i.e. India Post staff, service organisation, i.e. India Post as



well as society and environment as shown in Figure 71. The team used not only user personas but also post-office staff personas to address their concerns as well.

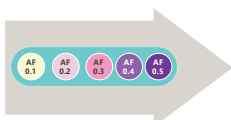
8.6.3 Observe

The team reflected on the methods and approaches followed in this Service Design case study, to address the diversity among service users across various parameters like culture, regions, age, etc. The findings are listed as follows.

Use of the CraftChange Current Intervention Cards during user research ensured the gathering of all the required information about existing services and the current context. In order to satisfy the broader intent of making India Post as the first choice of the citizen and increasing the adoption of its services to a great extent, it was decided to apply the approach of Service Design aimed at behaviour change. The CraftChange Framework was found to be apt to design end-to-end services progressing the users from one stage of behaviour (for example, not knowing about the services or not using the services despite awareness) to another (for example, sustained use of the service or advocating the service to others). The framework guided the design team to ensure completeness of solution concepts. The CraftChange Empathy Square guided the design team throughout the ideation process to design a more sustainable and balanced solution, useful for all involved primary stakeholders. For example, it led us to create not only user personas but also human touchpoints, i.e. post office staff personas in order to address their concerns as well through the designed service. One of Empathy Square nodes being 'society and environment', it helped the design team to focus on cultural, societal and environmental aspects of the proposed service. Overall, the CraftChange Framework and behaviour change outlook were found to be effective in addressing the element of diversity at various junctions. Initially, the personas were created to highlight various cultural backgrounds. Later in the process, diversity was an essential thread that led to designing various user journeys based on their stage of behaviour change.

Feedback received is as follows:

- Needed a process familiarisation session
- Need to mention that it is one iteration as a whole process
- Guidance on idea concept prioritisation Canvas and reducing the complexity
- Guidance on the clustering process
- Convergence and divergence to be more prominent



- A few participants needed detailed guidance, and a few were happy with minimal instructions

8.6.4 Reflect

This case study demonstrated the usefulness and effectiveness of the CraftChange Service Design framework for behaviour change. It enabled Service Designers to design new services aimed at the design brief consisting of sustained behaviour change of diverse Indian users. The CraftChange Framework allowed us to design the new service, i.e. Event Invitation Management Service holistically, by addressing concerns of all the stakeholders that are affected within the service ecosystem. It brought out the focus on the societal and environmental aspects of the service. It allowed us to systematically design a service that seemed complete, enriched, long-lasting and working for all in a balanced manner. Overall, CraftChange Framework's usage was found to be beneficial for solving behaviour change problems in a multi-cultural context.

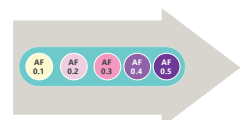
8.6.5 Refine

Following are the identified refinements:

- Separate training for Service Designers and Ideation workshop participants
- CraftChange Process modified to indicate explicit cycles for iterative design
- Changed the name of the Canvas from 'Problem synthesis' to 'Problem space synthesis' Canvas

8.6.5.1 CraftChange Training Workshop Agenda for Lead Service Designers

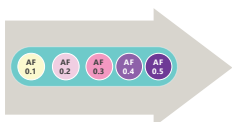
- Prerequisite Knowledge
- Service and Service Design
- Service Design Process
- User research methods (primary and secondary)
- In-process artefacts like personas, customer journey maps, service blueprint etc.



- Ideation techniques, clustering
- CraftChange Service Design Framework (3 Hours)
- Overview of Behaviour change and its implications for Service Design (30min)
- CraftChange conceptual models (30min)
 - CraftChange - Empathy Square
 - CraftChange - Intervention Matrix
 - CraftChange - Behaviour Change Progression Model
- When to use CraftChange Service Design framework, CraftChange process (20min)
- CraftChange - Canvases and Cards (40min)
- Mini Activity to reinforce CraftChange understanding (45min)
- Discussion (15min)
- CraftChange training workshop - feedback

8.6.5.2 CraftChange Training Workshop Agenda for Ideation workshop participants

- Prerequisite Knowledge (preferred)
- In-process artefacts like persona
- Ideation techniques, clustering
- CraftChange Service Design Framework (1 Hour)
- CraftChange conceptual models (15 min)
- CraftChange - Empathy Square
- CraftChange - Behaviour Change Progression Model
- Ignite Cards and Challenge Cards (20min)



- CraftChange – Design Ideation Canvas (15 min)
- Discussion (10min)
- CraftChange training workshop - feedback

8.7 CraftChange Assessment Summary

To decide what is the right form to integrate the behaviour change principles, models and frameworks in the right manner so that they are useful and effective for Service Designers, arrived at a hypothesised model and the form was created through extensive literature review and practitioner knowledge. The Hypothesised model was prima facie validated through formative and summative assessments, as shown in Figure 55 and Chart 12.

As per Jakob Nielsen, “... *the general observation (is) that heuristic evaluation seems to work best with three to five evaluators...*” (Nielsen, 1994). As explained in section 4.5, relevant methodologies were applied to assess the CraftChange Framework. In line with the observations of (Chakrabarti & Blessing, 2016), validation of a framework spanned from testing for internal consistency to the usefulness to achieve its purpose. The researcher also observed the following challenges during the CraftChange Framework assessment.

- The difficulty of repeatability of exact steps considering the creative space,
- The difficulty of finding a statistically significant number of Service Designers willing to apply in case studies,
- The considerable time required to access the CraftChange Framework in the Service Design Life Cycle

8.8 Chapter Conclusion

This Chapter discussed the iterative evaluation of the framework in use through various workshops where the insights from each cycle of use were fed back into the refinement of the CraftChange Toolkit. The focus of evaluation and assessment was finding CraftChange Toolkit's usefulness, completeness and effectiveness. The use of the CraftChange Service Design framework in five different case studies from business and the public sector asserted that this framework is found to be useful and usable to be deployed by Service Design practitioners and design students from India and Italy. Engaged participants also found it helpful in terms of increasing knowledge about behaviour change principles and helped to look at the design brief from a different perspective. The next Chapter reflects on the overall process, along with various contributions made through this PhD.



9 Discussion and Future Work

9.1 Summary of the Thesis

Design is a creative act of problem-solving and helping people to achieve their goals. Considering the industrial shift from products to services, it becomes essential to understand the core difference between products and services and how it has evolved (Chapter 2 - Service Design and Behaviour Change - An Overview). Differentiating characteristics between products and services lead to the differences in product design and Service Design process.

However, interestingly it has been found that, be it a product or service or any other design, it affects people's behaviour, a consideration not always factored into the design process by the designer. The design output also leaves an impact on environmental sustainability, social wellbeing and financial wellbeing of all the involved stakeholders. Hence, it is well accepted that designers have a more significant role to play to tackle all such influences. Designers, though, especially services designers, are not well equipped to handle this situation, and hence, the opportunity was identified for research to find enabling mechanisms for Service Designers.

The design has the potential to create the desired impact on people's lives by deliberately considering its behavioural influences. Hence, it was crucial to understanding the intersection of Service Design and behaviour change (Chapter 2 - Service Design and Behaviour Change - An Overview). In this research, we have reviewed the concept of 'behaviour' in a range of fields, concentrating on transposable insights applicable in design, and idea generation methods and problem-solving in design. It identified the transposable insights applicable in Service Design and mapped them to the standard Service Design methodology. It also identified the challenges faced by the Service Designer to influence sustainable behaviour through Service Design.

The right form to integrate the behaviour change principles, models and frameworks in a proper manner so that they are useful and practical for Service Designers to

apply those, was decided through extensive literature review and practitioner knowledge. It started with a hypothesised CraftChange – Knowledge Framework created through a comprehensive literature review and iteratively refined through formative assessments. The literature review is divided into three significant parts. In the first part, the focus is to understand the behaviour, types of behaviour and various aspects related to behaviour change. In the second part, the focus is to understand multiple integrative frameworks, existing comprehensive reports and synthesised behaviour models. The third part is focused on literature integrating design and behaviour change. Apart from this contextual literature review, prior work was also referred to, as and when required.

To address the needs and concerns of all involved stakeholders in a balanced manner, the role of ethics has also been studied (Chapter 2 - Service Design and Behaviour Change - An Overview). It led to the emergence of the CraftChange – Empathy Square (Chapter 5 - Development of CraftChange Knowledge Framework). The review of current frameworks and available toolkits helped to understand the current state of the art and identify the need for the framework (Chapter 3 - Research Gap Analysis).

The contextual literature review (Chapter 3 - Research Gap Analysis) of Service Designer's challenges in addressing the behaviour change aspects, revealed the need for inter-disciplinary knowledge transfer in design for behaviour change. Some attempts have been made in the past to help the designers mainly during the idea generation phase of the design processes. However, the opportunity to provide active guidance throughout the Service Design process based on the conceptual model was still open, and very little research happened in this space.

Further, an appropriate research methodology has been identified through a contextual literature review (Chapter 4 - Research Methodology). The investigation is more inclined towards real-life and a more natural way of doing Service Design. The purpose is to meet the primary need for developing actionable guidance for Service Designers. The investigation/s included theoretical viewpoints as well as various methodologies, methods and design practices. Conceptualisation, design, development and evaluation of the CraftChange Service Design Framework followed Action Research principles at its core, through multiple 'Plan-Act-Observe-Reflect-Refine' cycles. Though mixed methods are used, it is mostly inclined towards qualitative methods. Research methods like workshops with multiple participants focusing on participant observations, Surveys, Interviews, self-reflection, Reverse Case Study Mapping are used in this thesis.



The overarching goal of the CraftChange Knowledge Framework development (Chapter 5 - Development of CraftChange Knowledge Framework) is addressing three aspects namely, 'what to change'; 'where to change'; 'content of change'; 'a form of content'; and 'how to apply' based on the knowledge available in other disciplines concerning the sustained behaviour change. Initially, the focus was on reflecting

Service Design and the sustained behaviour change interplay to enable an integrated view to the Service Designer. The mapping of Service Design characteristics and multiple behaviour change frameworks such as the Transtheoretical Model (Stages of Change), Precaution Adoption Process, Fogg behaviour Grid, Behaviour Change Wheel - Susan Michie and CREATE Action Funnel (Stephen Wendel) is leveraged to develop the Knowledge Framework. The common good aspect of the research question is addressed through the various aspects of *'what is ethical'*. The need to address *'what is ethical'* led to the conceptualisation, design and visualisation of the Empathy Square. The Empathy Square also considers the broader environmental and socially beneficial behaviour aspects and the role of the Service Designer in addressing them. The conceptual model of the Empathy Square is made available to apply to the problems at hand by realising the CraftChange Knowledge Framework as actionable guidance through various canvases, cards and the process to apply these, (Chapter 7 - Development of CraftChange Toolkit).

The CraftChange Knowledge Framework and Toolkit (Chapter 5 - Development of CraftChange Knowledge Framework and Chapter 7 - Development of CraftChange Toolkit), have touched all the significant phases of the Service Design life cycle starting from Discover, Define, Develop and Deliver (as mentioned by Double Diamond Process). During the Discover phase, it investigated what to look for to understand the current behaviours and what will constrain or facilitate the desired behaviour. During Define, i.e. the ideation phase, it investigated how to make various behaviour change principles and models available to Service Designers to come up with design interventions to facilitate the change from the current behaviour to the intended target behaviour. During the *'Develop'* phase, it investigated the relevant enablers to see whether these design interventions are getting realised through the prototypes and showing the expected behaviour change during testing. The CraftChange Process helped in identifying the current behaviour, determining the target behaviour, levels of abstraction of stages of change and graduating from one stage to the next stage. These considerations arrived at a final shape through iteratively validating and reflecting on feedback through thought experiments and expert interviews (Chapter 6 - Assessment of CraftChange Knowledge Framework). These iterative cycles not only helped to refine the framework but also helped to identify implications for the future development of the process and artefacts.

A contextual literature review helped to identify the right *'form'* for various artefacts of the CraftChange Toolkit (Chapter 7 - Framework Development). It was found that there are multiple ideation toolkits available as a *'library'* of principles, strategies and mechanisms for influencing behaviour through design. Hence this thesis does not focus much on the form of these artefacts during the ideation process since any of the existing tools such as Lockton's toolkit, Bridgeable cards and Ideo cards can be used. CraftChange - Ignite Cards are compiled to facilitate the formative and summative assessment of the CraftChange Framework, but it is not the main contribution of this thesis, and the copyright remains with the original authors.

Service Designers are free to use any ideation cards, which give easy access to



Discussions

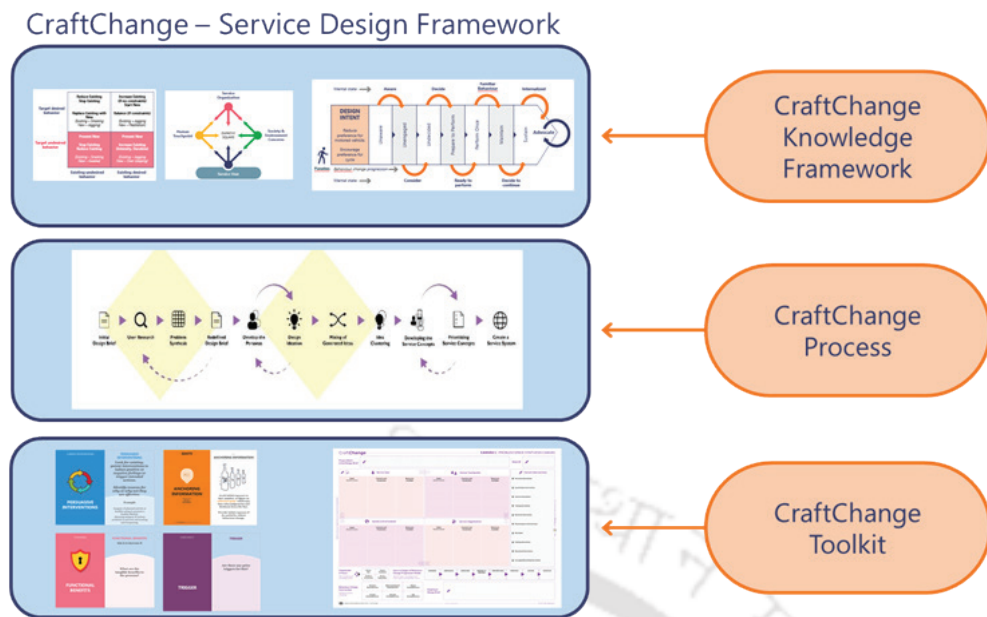


Figure 72: CraftChange Service Design Framework

behaviour change principles instead of CraftChange - Ignite Cards. The purpose of CraftChange - Ignite Cards is to allow Service Designers to trigger creative thinking leading to many ideas around progressive behaviour change.

As part of the assessment of the CraftChange Toolkit (Chapter 8 - Assessment of CraftChange Toolkit), the formative and summative studies were conducted in the industry as well as in academia, where participants designed services using the CraftChange Framework. The design briefs mostly revolved around behaviour change. Reflections from these studies evolved the CraftChange Toolkit. The CraftChange Framework (refer Figure 72) composed of the CraftChange Knowledge Framework (consisting of the Empathy Square, Intervention Matrix, Behaviour Change Progression Model), the CraftChange Toolkit (consisting of canvases and cards based on behaviour change through Service Design) and the CraftChange Process (allowing to use the framework and toolkit) were the primary research output. The Framework was evaluated and refined through multiple formative and summative assessments. The insights from each cycle of use were fed back into the refinement of the CraftChange Framework. The primary focus of evaluation and assessment was finding the CraftChange Framework's usefulness, completeness and effectiveness. The majority of the respondents said that they were likely to recommend the CraftChange Framework to other designers. A significant number of respondents also said that their knowledge about behaviour change had increased as a result of using the CraftChange Framework. Imbued behavioural knowledge among designers by gaining practical experience of using the behavioural knowledge on-the-field will enable them to consider the behaviour change perspective while solving any design problems in future. The use of the CraftChange Service Design framework in five different case studies from business and the public sector asserted that this framework was found useful and usable to involved Service Design



Discussions

practitioners and design students from India and Italy. Engaged participants also found it helpful in terms of increasing knowledge about behaviour change principles and helped to look at the design brief from a different perspective. The Empathy Square enabled them to view the problem from the environmental, social and financial wellbeing perspectives. It facilitated them to change their attitude and outlook toward designing services.

9.2 Discussion

This section elaborates the various situation and decision points where there was certain vagueness of information and a need to decide judiciously. Following are a few points which are interesting to look at from multiple perspectives.

9.2.1 Process Flexibility and Creativity

It was in line with the theme of the CraftChange Framework to provide the required flexibility to the users of the framework without curbing their creativity. During multiple interactions with the users, it was observed that there was some difference between ‘*planned use*’ versus the ‘*actual use*’ of the cards and canvases. The usage improvisation was exciting to see. For example, during Iteration 5 – Formative Study 3 (Chapter 8.3), the designer created their own Current Intervention Cards based on the CraftChange Current Intervention Cards with insights from user research



Figure 73: Contextual Current Intervention Cards



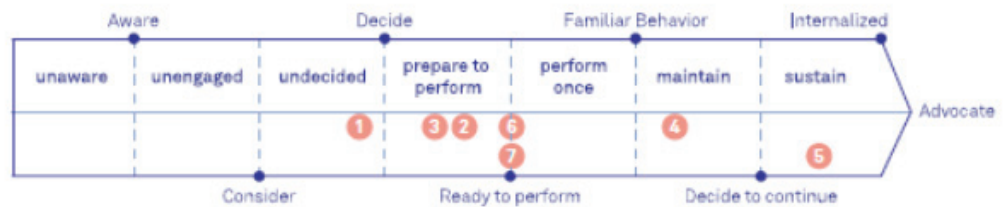
Travel planners (atm, google maps...)



Public transport



Car sharing



Bike sharing

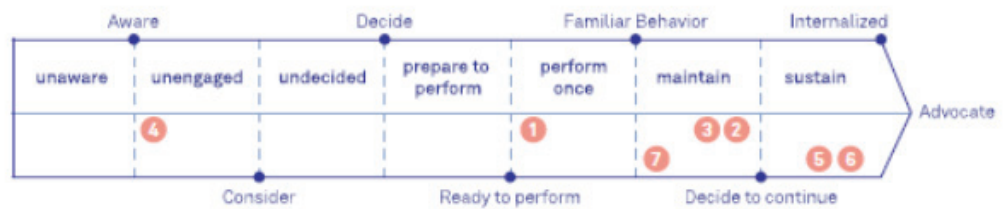


Figure 74: Innovative Way To Represent Personas

(refer Figure 73). The designer used these cards as part of the ideation workshops to educate other participants.

The designers have also used the CraftChange Behaviour Change Progression Model innovatively to indicate where the persona stands as well as to indicate the coverage of the user research, as shown in Figure 74.

Following are examples from various studies regarding the use of the CraftChange Cards at the intervention points mentioned in the CraftChange Process. The study participants came up with various ways of using cards in the team such as



- Distributing the cards equally within the team

- Sometimes, passing the used Cards to other members
- Keeping the Card deck at the centre where members are supposed to withdraw one card at a time and keep it aside after use
- In three cases, members wanted to refer to all the Ignite Cards by the end of the process

During ideation, teams followed multiple ways to transfer the ideas on to the Canvas and use the Challenge Cards differently. Following are the few variations noticed during the iterations.

- Writing the idea on a sticky note and transferring it to Canvas immediately
- First, writing all the ideas on sticky notes individually and transferring them together to the Canvas as the next step
- Sometimes the team discussed the CraftChange Cards in a group for each idea
- Others decided to use the Challenge Cards individually while transferring the idea to the canvas

All these instances are good examples of process flexibility leading to creativity. It is always a discussion point of how one can provide actionable guidance without curbing people's creativity. There are no standards for it, but it evolves through the usage.

9.2.2 Quantity versus Quality of Assessment

Generally, towards validation of any new framework, it is suggested to have a good number of users testing it. However, it is not always possible to get the required number of users validating the new framework such as the CraftChange Framework. Service Designers are the intended users of the CraftChange Framework, and they need to use this framework during the complete Service Design life cycle to check their usefulness and effectiveness. Due to this, need to identify the Service Designers who are willing to use the new framework in Service Design projects and provide feedback about the framework. So, in such situations, identifying the early adaptors is a challenge and need specific consideration.

In the Service Design context, as mentioned in section (3.3: Indian Design Practitioner Survey), there are not many Service Designers in India who can help in assessing this framework. To mitigate this, the researcher conducted two



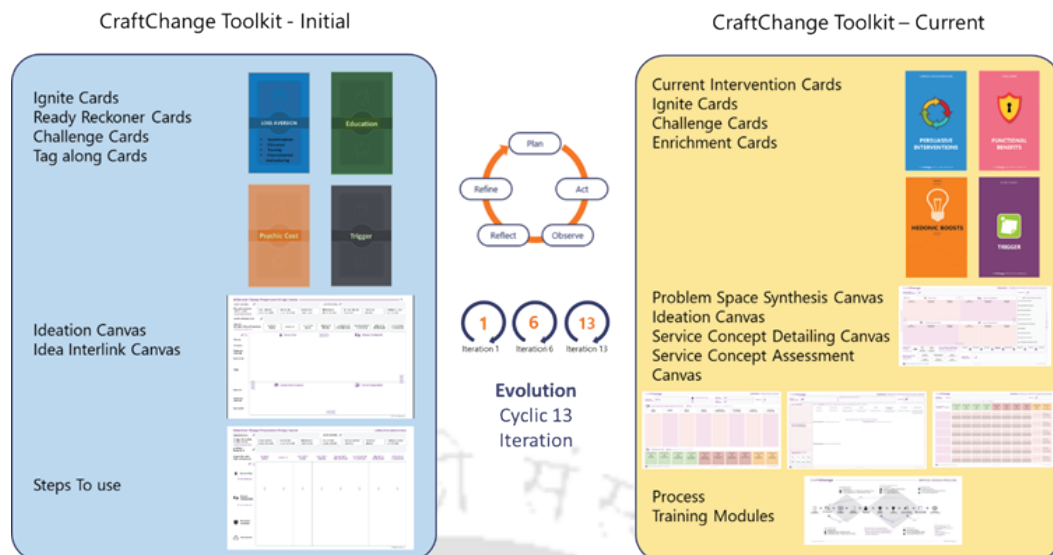


Figure 75: CraftChange Framework Initial and Current

assessment studies at the School of Design, Politecnico Di Milano, Italy, where the leading Service Designers participated in this exercise.

The CraftChange Framework had evolved through a total of thirteen iterations (refer Figure 75) composed of self-reflection, reverse case study mapping, practitioner interviews and, formative and summative studies.

The numbers of participants in formative and summative studies varied from four to eight. As per Jakob Nielsen, *“In principle, individual evaluators can perform a heuristic evaluation of a user interface on their own, but the experience from several projects indicates that fairly poor results are achieved when relying on single evaluators. Averaged over six previous projects of them, single evaluators found only 35 % of the usability problems in the interfaces. However, since different evaluators tend to find different problems, it is possible to achieve substantially better performance by aggregating the evaluations from several evaluators... the general observation that heuristic evaluation seems to work best with three to five evaluators...”* (Nielsen, 1994)

It is a continuing discussion about how to validate the limits of a theory, a model or a framework. The criteria for these validations include the testing for internal consistency, its usefulness, among others. General criteria used is whether the model or theory or framework is adequate to achieve its purpose.

Several challenges to such validation are: (Chakrabarti & Blessing, 2016).

- *The difficulty of repeatability of phenomena,*



- *The large number of factors obscuring ‘clear and identifiably strong’ influences,*
- *The difficulty of finding statistically significant samples of subjects or cases,*
- *Difficulty of generating reliable data about the phenomena under investigation,*
- *Lack of specification of intended focus and application area of the theory or model.*

“People use several ways of validation, for example, by comparative studies, by comparing and reducing gaps between research and practice models, by comparing multiple practice-based models, or by referring to an existing theory which is already validated.” (Chakrabarti & Blessing, 2016).

‘Usefulness with respect to a purpose’ is also one of the ways of validation of the framework as explained in ‘The validation Square’ (Seepersad, et al., 2006) as explained in section (8.7: CraftChange Assessment Summary).

The researcher decided to assess the CraftChange Framework for the ‘fit for use’ perspective by mostly qualitative methods through various formative and summative studies. On reflecting, the researcher feels that it was the right decision. Researchers can use the appropriate methods to evaluate the ‘fit for use’ where a large number of users are not required if they are done through iterative cycles of ‘Plan-Act-Observe-Reflect-Refine’. This is an area where there is scope for discussion, and further investigation is required for the benefit of the design research community..

9.2.3 When to Stop Iterative Cycles

While using the iterative methodology (‘Plan-Act-Observe-Reflect-Refine’ cycle’) as followed in this thesis, it is always a discussion point as to how many such iterations are good enough for the purpose and as to when to stop this cycle. There is a lack of guidance in this regard, and it seems there are no strict ways of concluding. The researcher has observed the following possible ways during practice:

- A predefined number of iterations
- Constraints imposed by time, money and effort
- No adverse feedback
- Possible saturation of feedback



- Confidence of participants for '*fit for purpose*'.

In this thesis, the researcher stopped the iterations where there was no adverse feedback as well as no feedback leading to the improvement of the framework. When the participants start showing the confidence that the framework under consideration is fit for the purpose, it is a good indication to stop the iteration and go for summative assessment.

9.2.4 The Dilemma of Physical versus Digital Toolkit

While conceptualising and designing a toolkit, the designer needs to make crucial decisions about the physical or digital nature of the toolkit. With the advent of technology, designers get tempted to use digital technology but are unable to decide. Typically, most of the design toolkit/s available take physical forms, and the popular ones are in the form of Cards and Canvases (7.2 - CraftChange Toolkit Design and Development).

Most of the design activities are seen to prefer the use of physical forms, including handy ones such as sticky notes and cards while working in collaboration as a collocated team. Designers want to use handy enablers during this process without getting distracted to technological gadgets. Some Design experts suggested going with the physical form over the digital one. As part of this thesis, the researcher decided to go with Cards and Canvases in physical form. As expected, it is very user-friendly, accessible and fitting into the natural way of doing things.

However, the researcher feels that, once the usefulness and effectiveness are established, these physical forms can be converted into touchpoints and digital technology can be used to enhance the overall experience. For example, the physical cards limit the amount of information that can be made available on the cards. However, the designer can choose to provide ways and means that enable access to more information digitally, whenever required. The congruence of the physical and digital is the way forward to design toolkits, and there is an opportunity to explore this area.

9.3 Reflections

While reflecting on the framework development and its assessment and comparing it with other available processes, toolkits and frameworks, multiple aspects emerged. As discussed in the discussion section, the other available toolkits and frameworks also can be used in the CraftChange Process as well as the CraftChange Framework artefacts can be used in other existing processes, due to their flexibility. Existing knowledge was looked for in the area of design for behaviour change as well as the fields addressing similar problems. As suggested by some of the workshop



participants, this thesis also discussed the possibility of using the conceptual model for finding gaps in the already designed or implemented services. Though the use of the CraftChange - Empathy Square was suggested to address the ethical issues, the other means to strengthen it in the framework was also discussed and added as part of the future scope of work.

This thesis investigation concludes that the CraftChange Service Design framework provides a different and unique integrative perspective compared with other existing toolkits and frameworks in a similar field. It has some overlap with them, but this framework also provides the integrative enabler to Service Designers while designing services for sustained behaviour change. It was assessed and concluded that the CraftChange Service Design framework enables Service Designers to do the intended job. The CraftChange Framework provides the integrative framework for the existing design patterns, behaviour change examples from diverse fields to use in the Service Design life cycle. A vital aspect of this framework is that it provides the process add-ons and flexibility of using other toolkits during the Service Design life cycle. The combination of a CraftChange Knowledge Framework, process, canvases, cards and guidance about using existing other toolkits make the CraftChange Framework a potential enabler for Service Design practitioners with less experience. It can perhaps never be considered 'complete', but it extends the possible ways of addressing a problem. The series of workshops and independent application of the CraftChange Framework by the early designer has shown that it is indeed usable, as part of a Service Design life cycle in tackling design briefs concerning behaviour change. Feedback from early users of the framework also confirmed that it was found useful for most of them. Together with case studies of the framework's use suggests that overall, it has had effects on, and is of use to, designers (and some others) as a Service Design framework. Design practitioners have found the framework valuable enough to incorporate it into their workflow and recommend it to others, although there is some scope for improvement in the framework. Some feedback has also been received on the use of the framework in the education domain as a Service Design framework with multidisciplinary perspectives and mode to utilise transfer learning. It was also suggested to develop it further as a problem discovery mechanism for already implemented services to identify and fix the existing issues. Overall, the framework has been applied to the kinds of briefs, suggesting that it applies to any situation wherein, behaviour change must be brought in, through the entire service system.

9.4 Contributions to The Knowledge

As one knows, Research is a systematic enquiry whose goal is to generate communicable knowledge: *“systematic because it is pursued according to some plan; an enquiry because it seeks to find answers to questions; goal-directed because the objects of the enquiry are posed by the task description; knowledge-directed because of the findings. of the enquiry must go beyond providing mere information;*



Discussions

and communicable because the findings must be intelligible to, and located within some framework of understanding, for an appropriate audience.” (Archer, 1995)

This thesis’s main contribution to the knowledge in the Service Design field focuses on a systematic research enquiry into enabling sustained behaviour change through Service Design. The goal of this enquiry is to produce communicable new knowledge in the form of a Service Design framework composed of the knowledge framework, process and toolkit.

RQ1-a: What should be **the form** of integrated **actionable guidance** of behaviour change principles, models and frameworks from relevant disciplines made available to the **Service Designers**?

RQ1-b: How to facilitate the behaviour progression towards the **sustained behaviour change** for the **common good** of all stakeholders?

Answers to the research questions RQ1-a and RQ1-b helped articulate the knowledge contribution in a structured manner. The theoretical framework, i.e. CraftChange – Knowledge Framework as well as the process and methods used for the iterative framework and toolkit development through the participatory design process; generated insights and reflections are also the contributions towards design research.

Every instance of systematically applying the process or method in a given context and insights arising from it along with reflections on the process or method is a contribution to knowledge. In the case of a framework developed as part of this thesis, a continuous knowledge contribution happened through the action research type cycles of toolkit development, testing and evaluation. Insights generated from each stage of the process served as input for the refinement and as the next version of the framework.

9.5 Contributions to The Practice

Answers to the research questions RQ1-a and RQ1-b also contributed to the knowledge in design practice through the framework itself, as a tool designed for and with design practitioners and design research through ‘Plan-Act-Observe-Reflect-Refine’ cycles of framework development, testing and evaluation, through a series of formative and summative workshops as part of the process of action research, with the insights arising from the process.

A primary contribution to knowledge in the design practice is made by the CraftChange Framework itself which is a manifestation of synthesising and organising techniques derived from extensive literature research to bring insights on behaviour from other disciplines together in a collective form for use by Service Designers.



- The work is original and does not appear to have been done before; the type of integration of behaviour change knowledge for influencing sustained behaviour change with the Service Design life cycle by the CraftChange Framework.
- Previous approaches, toolkits and framework in design for sustainable behaviour, persuasive technology and similar ones have not offered the same kind of end-to-end Service Design life cycle enablement.
- Previous collections of behaviour-related design patterns and techniques were mainly proposed in the ideation phase and not across the Service Design life cycle. The framework also has advanced the understanding of the Service Design practice:
- There was an opportunity for a resource addressing Service Design for sustained behaviour change. CraftChange has contributed to satisfying that opportunity.
- Looking at the long-term use of the CraftChange Framework in industry and education will help explore further aspects of the '*of use*' question and will suggest improvements and future directions for development, make the framework more valuable to Service Design practitioners.
- Practical findings have also enabled reflection on workshop processes, framework design, use cases and involving practitioners and on ethics and intent of behaviour change in design practice.

9.6 Limitations

Unavoidably, a PhD has many paths not explored due to the constraints of time, finances and academic requirements. The researcher believes that the toolkit form/s need more experimentation to check the effect on designers and designed outputs though the current proposed form is found to be effective. The skills, interests, backgrounds of the workshop participants inherently limit the effectiveness of formative and summative workshops and their generalizability. It has tried to counter this by multiple formative and summative workshops with diverse participants across the continents (Pune, Mumbai, Milan) as well as for the different types of social and business problems. The general feeling is that workshops impart an artificial nature to the sessions and the outputs and outcomes generated may not be applicable outside of the given context. To counter this issue, some real-life problems were considered for solving, making sure that relevant stakeholders were part of the workshops. However, these are still 'artificial' in nature, but close to reality, and ideally need to be used in an actual business context. The Framework was made available to the Service Design



team in the researcher's current organisation to use the framework in everyday work contexts for their problems. They continuously provided the feedback informally. It may take a long time to establish CraftChange as their go-to framework and customise it to their needs. The early feedback from them helped to address these limitations.

Lack of broader acceptance is another current limitation necessarily due to the biased sampling of workshops participants. The participation invitation was naturally inclined towards people who are ready to devote some time, had a preliminary idea of the framework, were interested enough to use it and willing to experiment with new ideas. The researcher's intention of developing this framework was to make it actionable and apply it in practice. This may have led to a sampling strategy, which is a part of a naturalistic sampling strategy. On reflecting, it seems like it was not a significant limitation, since, for any new framework, one needs early adopters and studying those early adopters provides useful insights for the research process. Same was the case in this research endeavour.

This framework helped to generate many ideas and service concepts inspired by the behaviour change principles which are already empirically validated, but due to time and resources required to conduct the longitudinal studies, it was not feasible to see the ideas realised on the ground and check their effectiveness. Nevertheless, it was out of scope since the focus was on building the framework based on the established behaviour change principles and frameworks.

9.7 Future Work

Following are the few potential research problems and directions for future work that emerged during this research endeavour.

- Explore the use of the CraftChange Framework for an educational context. It can be useful as a service design framework with multidisciplinary perspectives and to demonstrate transfer learning.
- Develop it further as a problem discovery mechanism for already implemented services to identify and fix the existing issues.
- Develop it further to support servitisation along with Product Design
- Exploring various other forms to instantiate the CraftChange Knowledge Framework to make it actionable for service Designers.
- Digitisation of the CraftChange Framework to enable multi-location collaboration.



10 Conclusion

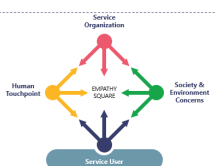
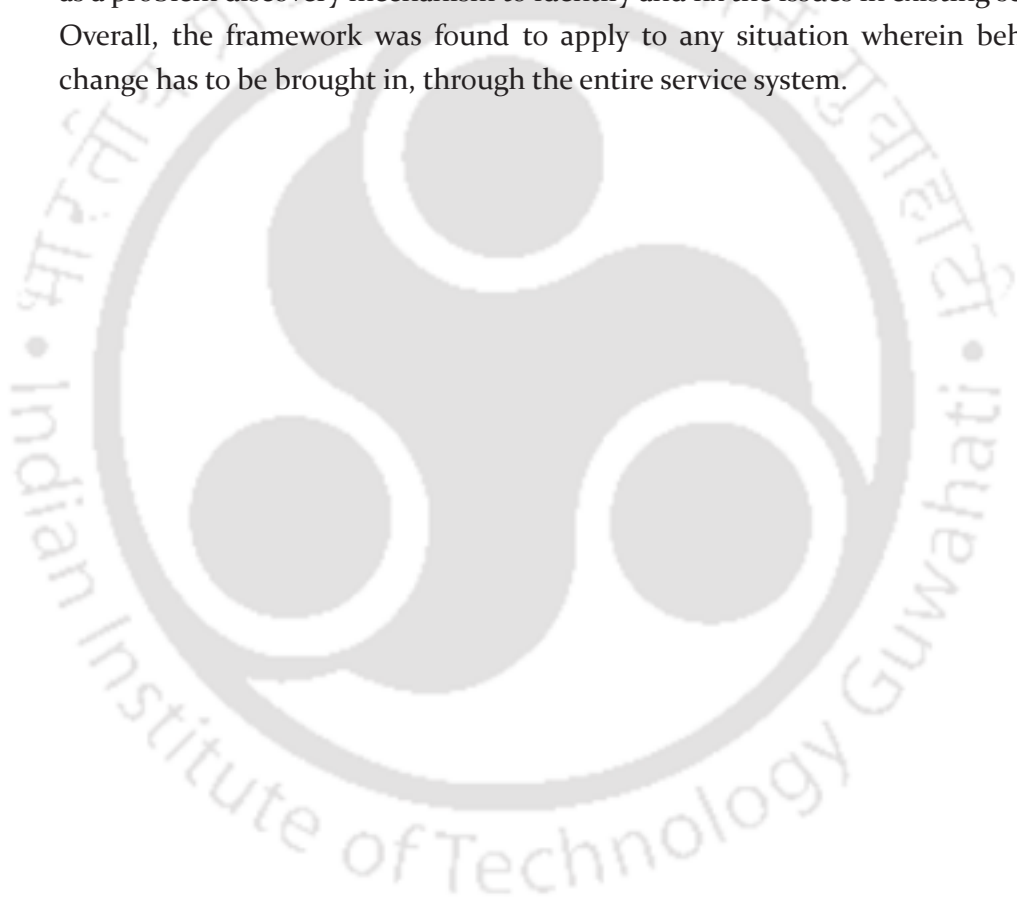
RQ1-a: What should be the **form** of integrated **actionable guidance** of behaviour change principles, models and frameworks from relevant disciplines made available to the **Service Designers**?

RQ1-b: How to facilitate the behaviour progression towards the **sustained behaviour change** for the **common good** of all stakeholders?

This thesis has pursued the investigation of these questions iteratively by following 'Plan-Act-Observe-Reflect-Refine' cycles. The resultant CraftChange Service Design framework is an example of iterative design, development and evaluation via action research, and research through design methodology. The heart of the CraftChange Service Design framework is the CraftChange - Behaviour Change Progression Model and the CraftChange -Empathy Square. The realised actionable guidance of this framework is composed of artefacts such as canvases and cards, and the process of using these artefacts in the Service Design life cycle.

This investigation concludes that the CraftChange Service Design framework provides a different and unique integrative perspective compared with other existing toolkits and frameworks in a similar field. Behavioural knowledge exists in the form of principles, models and theories, but only a few design toolkits and frameworks exist that leverage this behavioural knowledge. These existing design toolkits are mostly applicable only in the ideation phase of design lifecycle. Service Design, due to its engagement and relationship with users over a more extended period across the usage of service, has the most significant potential to influence people's behaviour. Moreover, hence it required different considerations in order to design for behaviour change. The CraftChange Framework for Service Design for behaviour change provides the integrative enablement in the form of actionable guidance to Service Designers throughout the Service Design lifecycle. The CraftChange Framework provides the integrative framework for the existing design patterns, behaviour change examples from diverse fields to use in a Service Design life cycle. One of its key aspects is that it provides the process add-ons and flexibility of using other toolkits also during the Service Design life cycle. The combination of

a conceptual framework, process, canvases, cards and guidance about using existing other toolkits make the CraftChange Framework a potential enabler for novice Service Design practitioners. Application of the CraftChange Framework by a novice designer on Service Design for behaviour change has shown that it is of use, and indeed usable, as part of a Service Design life cycle tackling design briefs concerning behaviour change. Feedback from early users of the framework reassured that it is found to be useful by most of them. Design practitioners have found the framework valuable enough to incorporate it into their workflow and recommend it to others, although there is some scope for improvement in the framework. Some feedback has also been received on the use of the framework in an educational Context as a Service Design framework with multidisciplinary perspectives, and how to utilise transfer learning. CraftChange was also suggested to be used and developed further as a problem discovery mechanism to identify and fix the issues in existing services. Overall, the framework was found to apply to any situation wherein behaviour change has to be brought in, through the entire service system.



Conclusion

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References

Abusafieh, S., & Razem, M. (2017). Human Behavior and Environmental Sustainability: promoting a pro-environmental behavior by harnessing the social, psychological and physical influences of the built environment. 23, p. 2003. EDP Sciences.

Acaroglu, L. (2019, Jan 25). How Design Designs Us - The Ethics of Design. Retrieved from Disruptive Design: <https://medium.com/disruptive-design/how-design-designs-us-part-3-the-ethics-of-design-ca40e33f5842>

Advanced Workshop on Designing for Behavior Change: Focus on Activities. (2017, May). Retrieved from <https://www.fsnnetwork.org>: https://www.fsnnetwork.org/sites/default/files/advanced_workshop_on_designing_for_behavior_change.pdf

Agogu , M., & Kazak i, A. (2014). 10 years of C--K theory: a survey on the academic and industrial impacts of a design theory. In An anthology of theories and models of design (pp. 219-235). Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50, 179-211.

Akasaka, F., Ohno, T., & Yasuoka, M. (2017). Challenges to Deploy Service Design in Organizations: Analysis Through "Scaling Up" Workshops. In F. Akasaka, T. Ohno, & M. Yasuoka, *Serviceology for Smart Service System* (pp. 89-98). Springer.

Akrich, M. (1992). The De-Description of Technical Objects in Bijker and Law (eds.) *Shaping Technology/Building Society: Studies in Sociotechnical Change*. Cambridge, MA: The MIT Press.

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: towns, buildings, construction* (Vol. 2). Oxford University Press.

Andy, C., & David, C. (1998). The extended mind. *Analysis*, 58(1), 7-19.

Arai, T., & Shimomura, Y. (2004). Proposal of service CAD system-a tool for service engineering. *CIRP Annals-Manufacturing Technology*, 397-400.

Archer, B. (1995). The nature of research. *Co-Design Journal*, 2(11), 6-13.

Ariely, D. (2008). Predictably irrational. Harper Audio.

Athavankar, U., Khambete, P., Roy, D., Chaudhary, S., Kimbahune, S., Doke, P., & Devkar, S. (2014). Multidisciplinary Team Dynamics in Service Design-The Facilitating Role of Pattern Language. India HCI 2014 Conference on Human Computer Interaction (p. 16). ACM.

Bandura, A. (1986). Social foundation of thought and action: A social-cognitive view. Englewood Cliffs.

Bannon, L. (2011). Reimagining HCI: toward a more human-centered perspective. *interactions*, 18(4), 50-57.

Behavioural Insights Team. (2014). EAST: Four simple ways to apply behavioural insights. Behavioural Insight Team.

Beyer, D. A. (2011). Reverse case study: To think like a nurse. *Journal of Nursing Education*, 50(1), 48-50.

Bhamra, T. (2004). Ecodesign: the search for new strategies in product development. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 218, 557-569.

Bitner, M. J., Ostrom, A. L., & Morgan, F. N. (2008). Service blueprinting: a practical technique for service innovation. *California management review*, 50, 66-94.

Blessing, L. T., & Chakrabarti, A. (2009). *DRM, a Design Research Methodology*. Springer.

Blomkvist, J. (2015). In-House Service Design Roles–A First Look. IASDR, (pp. 201-213). Brisbane .

Blomkvist, J., & Segelström, F. (2014). Benefits of External Representations in Service Design: A Distributed Cognition Perspective. *The Design Journal*, 17, 331-346.

Boaden, R. (2009). Quality improvement: theory and practice. *British Journal of Healthcare Management*, 15(1), 12-16.

Boks, C. (2012). Design for sustainable behaviour research challenges. In C. Boks, *Design for Innovative Value Towards a Sustainable Society* (pp. 328-333). Springer.

Bowker, G. C., & Star, S. L. (2000). *Sorting things out: Classification and its consequences*. MIT Press.

Brautigam, B. (2018, May 18). How Design Thinking will fix Design Thinking. Retrieved from How Design Thinking will fix Design Thinking: <https://medium.com/muz.li/how-design-thinking-will-fix-design-thinking-5ce735b4c029>

Brereton, P. a., Budgen, D., Turner, M., & Khalil, M. (2007). Lessons from applying the systematic literature review process within the software engineering domain. *Journal of systems and software*, 80, 571-583.

Bridgeable. (2017). Designing Behaviour Change. Retrieved from Bridgeable: <https://toolkit.bridgeable.com/behavioural-economics-principles>

Brown, T. (2009). *Change by design*. HarperBusiness, an imprint of HarperCollins Publishers.

Buchanan, R. (2001). Design research and the new learning. *Design issues*, 17(4), 3-23.

Buddhism 500BC. (2015, May 16). Retrieved from <http://online.sfsu.edu/~rone/Buddhism/Shurangama/Shurangama.htm>

Budds, D. (2017, 05 31). 6 Designers Explain Why Craft Still Matters In A Digital World. Retrieved from FastCompany: <https://www.fastcompany.com/90127475/6-designers-explain-why-craft-still-matters-in-a-digital-world>

Bullinger, H., Fahrnich, K. P., & Meiren, T. (2003). Service engineering-methodical development of new service products. *International Journal of Production Economics*, 275-287.

Burghardt, J. (2009). *Working Through Screens: 100 Ideas for Envisioning Powerful, Engaging, and Productive User Experiences in Knowledge Work*. Flashbulb Interaction, Incorporated.

Burns, C. C. (2006). *Transformation Design*. Red Paper 02, London: Design Council.

Carvalho, F., Jun, G. T., & Mitchell, V. (2017). Participatory design for behaviour change: An integrative approach to healthcare quality improvement. University of Cincinnati.

Celaschi, F. (2017). Advanced design-driven approaches for an Industry 4.0 framework: The human-centred dimension of the digital industrial revolution. *Strategic Design Research Journal*, 10(2), 97-104.

Chakrabarti, A., & Blessing, L. (2016). A review of theories and models of design. *Journal of the Indian Institute of Science*, 95(4), 325-340.

Checkland, P. (1981). *Systems thinking, systems practice*.

Clatworthy, S. (2011). Interaction Design: Services as a series of interactions. *This is Service Design Thinking*, 80-87.

Confederation of Indian Industry (CII). (2015). *India Design Report*. New Delhi: Confederation of Indian Industry. Retrieved December 11, 2016, from <http://www.cii.in/webcms/Upload/a2.pdf>

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods*. Irwin New York: McGraw-Hill.

Cooper, J. (2016). *London's Waste Strategy and Statistics*. International Solid Waste Association.

Cross, N. (1982). Designerly ways of knowing. *Design studies*, 3(4), 221-227.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.

Daae, J. L., Goile, F., Seljeskog, M., & Boks, C. (2016). Burning for sustainable behaviour. *Journal of Design Research*, 14, 42-65.

Dalsgaard, P., & Dindler, C. (2014). Between theory and practice: bridging concepts in HCI research. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1635-1644). ACM.

Darnton, A. (2008). *GSR Behaviour change knowledge review. Practical guide: an overview of behaviour change models and their uses*. Report for Government Social Research Unit. London, Centre for Sustainable Development, University of Westminster.

Das, B. (2017, Feb 20). Design for tomorrow is not about mere problem solving but cultivating a better co-living ecosystem. Retrieved from <https://bhaskarjyotidas.com/2017/02/20/design-for-tomorrow-is-not-about-mere-problem-solving-but-cultivating-a-better-co-living-ecosystem/>

Davison, R. M. (1998). *An action research perspective of group support systems: How to improve meetings in Hong Kong*. Unpublished PhD Dissertation, City University of Hong Kong.

DEFRA. (2008). A framework for pro-environmental behaviours. London,: DEFRA.

Design Council, U. (n.d.). Retrieved 11 01, 2016, from http://www.mech.hku.hk/bse/interdisciplinary/what_is_design.pdf

Desmedt, J., Vekemans, G., & Maes, D. (2009). Ensuring effectiveness of information to influence household behaviour. *Journal of Cleaner Production*, 17, 455-462.

Dictionary.com, LLC. (n.d.). Dictionary.com. Retrieved from Dictionary.com: <https://www.dictionary.com/browse>

Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). MINDSPACE: influencing behaviour for public policy.

Down To Earth. (2019, 04 03). Swachh Bharat is now about toilets built, not change in attitude: Experts. Retrieved from www.downtoearth.org.in: <https://www.downtoearth.org.in/news/water/swachh-bharat-is-now-about-toilets-built-not-change-in-attitude-experts-64236>

Durling, D. (2000). Working Papers in Art and Design. Working Papers in Art and Design, 1.

Eckert, C., & Stacey, M. (2000). Sources of inspiration: a language of design. *Design studies*, 21(5), 523-538.

Economic Times. (2018, 04 05). Vehicles figure in Pune overtakes human population. Retrieved from ET Auto.com: <https://auto.economictimes.indiatimes.com/news/industry/vehicles-figure-in-pune-overtakes-human-population/63629384>

Elias, E. W., Dekoninck, E. A., & Culley, S. J. (2007). The potential for domestic energy savings through assessing user behaviour and changes in design. *EcoDesign 2007 - 5th International Symposium on Environmentally Conscious Design and Inverse Manufacturing*. University of Bath.

Elkington, J. (1997). *Cannibals with forks: the triple bottom line of twenty-first century business*. Capstone. Oxford.

Ellen MacArthur Foundation. (2015). *Towards a Circular Economy: Business rationale for an accelerated transition*. Ellen MacArthur Foundation.

Ethics: a general introduction. (2014). Retrieved Feb 2018, 23, from Ethics Guide: http://www.bbc.co.uk/ethics/introduction/intro_1.shtml

Fensel, D., Facca, F. M., Simperl, E., & Toma, I. (2011). *Semantic web services*. Springer Science & Business Media.

Fischer, G. (2003). *Distributed cognition: A conceptual framework for design-for-all*. *HCI International*, 4, pp. 78-82. Greece: Lawrence Erlbaum Associates, Mahwah, NJ and Crete.

Fogg, B. J. (2009). A behavior model for persuasive design. *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.

Fogg, B., & Hreha, J. (2010). Behavior wizard: a method for matching target behaviors with solutions. *International Conference on Persuasive Technology* (pp. 117-131). Springer.

Frayling, C. (1993-4). *Research in art and design*. Royal College of Art Research Papers, vol 1, no 1, 1(1).

Friedman, B., Kahn, P. H., Borning, A., & Huldtgren, A. (2013). Value sensitive design and information systems. In *Early engagement and new technologies: Opening up the laboratory* (pp. 55-95). Springer.

Friedman, K. (2008). Research into, by and for design. *Journal of Visual Art Practice*, 153-160.

Gasson, S. (1999). The reality of user-centered design. *Journal of Organizational and End User Computing (JOEUC)*, 11(4), 5-15.

Gero, J. S., & Kannengiesser, U. (2014). The function-behaviour-structure ontology of design. In *An anthology of theories and models of design* (pp. 263-283). Springer.

Getzels, J. W. (1987). Creativity, intelligence, and problem finding: Retrospect and prospect. *Frontiers of creativity research*, 88-102.

Goenka S. N. (2015, May 16). THE DISCOURSE SUMMARIES Talks from a Ten-Day Course. Retrieved from Dhamma: <http://www.dhamma.org/>

Golembewski, M. (2010). Ideation decks: A card-based tool designed to help creative practitioners develop project ideas. Horizon DTC report, University of Nottingham.

Golembewski, M., & Selby, M. (2010). Ideation decks: a card-based design ideation tool. *8th ACM Conference on Designing Interactive Systems* (pp. 89-92). ACM.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in experimental social psychology*, 38, 69-119.

Granovetter, M. (1978). Threshold models of collective behavior. *American journal of sociology*, 83, 1420-1443.

Gray, D., Brown, S., & Macanuso, J. (2010). *Gamestorming: A playbook for innovators, rulebreakers, and changemakers*. O'Reilly Media, Inc.

Hansemark, O. C., & Albinsson, M. (2004). Customer satisfaction and retention: the experiences of individual employees. *Managing Service Quality: An International Journal*, 40-57.

Hanttu, A. (2015, 03 10). Six attributes of a good service designer. Retrieved from Futurice: <https://www.futurice.com/blog/a-good-service-designer>

Harper, E. R., Rogers, Y., Sellen, A., Human, B., & others. (2008). *Human-Computer Interaction in the Year 2020*.

HM GOVERNMENT. (2005). *Securing the future: The UK Government Sustainable*. London,: HM GOVERNMENT.

Hollan, J., & Kirsh, E. H. (2000). Distributed Cognition: Toward a New Foundation for Human-Computer Interaction Research. *ACM Transactions on Computer-Human Interaction*, 7(2), 174-196.

Hutchins, E. (1995). *Cognition in the Wild*. MIT Press.

Hutchins, E. (2000). Distributed cognition. *International Encyclopedia of the Social and Behavioral Sciences*. Elsevier Science.

IDEO. (2019). Method Cards. Retrieved from IDEO: <https://www.ideo.com/post/method-cards>

Jelsma, J. (1999). Philosophy meets design, or how the masses are missed (and revealed again) in environmental policy and ecodesign. *Consumption, Everyday Life and Sustainability*, Centre for the Study of Environmental Change, Lancaster University.

Johnson, J., & Henderson, A. (2002). Conceptual models: begin by designing what to design. *Interactions*, 9(1), 25-32.

- Jonas, W. (1996). *Systems thinking in Industrial Design*. Massachusetts: ICSDS.
- Jones, J. C., & Jacobs, D. (1998). PhD research in design. *Design Studies*, 19(1), 5-7.
- Joyce, A., & Paquin, R. L. (2016). The triple layered business model canvas: A tool to design more sustainable business models. *Journal of Cleaner Production*, 135, 1474-1486.
- Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *American economic review*, 93(5), 1449-1475.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.
- Keyson, D., & Bruns, M. (2009). Empirical research through design. 3rd IASDR Conference on Design Research, (pp. 4548-4557).
- Khambete, P. (2013). *Designing desirable service experience: a pattern language framework for designing touch point ecosystems*. Indian Institute of Technology Bombay.
- Kimbell, L. (2011). Designing for service as one way of designing services. *International Journal of Design*, 5.
- Kimbell, L. (2011). Rethinking design thinking: Part I. *Design and Culture*, 3(3), 285-306.
- Kimbell, L. (2012). Rethinking design thinking: Part II. *Design and Culture*, 4(2), 129-148.
- Kimbell, L. (2014). *The service innovation handbook: Action-oriented creative thinking toolkit for service organizations*. BIS publishers.
- Kirsh, D. (2010). Thinking with external representations. *AI & Society*, 25, 441-454.
- Kitchenham, B., & Charters, S. (2007). *Procedures for Performing Systematic Literature Reviews in Software Engineering*. Keele University & Durham University, UK.
- Kolko, J. (2010). *Thoughts on interaction design*. Morgan Kaufmann.
- Koter, P. (2000). *Marketing Management (The Millennium Edition)*. Upper Saddle River, NJ: Prentice-Hall, Inc.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford university press.

Leonard, T. C. (2008). Richard H. Thaler, Cass R. Sunstein, *Nudge: Improving decisions about health, wealth, and happiness*. *Constitutional Political Economy*, 19, 356-360.

Lewin, K. (1946). Action research and minority problems. *Journal of social issues*, 2(4), 34-46.

Licklider, J. C. (1960). *Man - Computer Symbiosis, Human Factors in Electronics*, IRE Transactions on 1.

Lilley, D. (2007). *Designing for behavioural change: reducing the social impacts of product use through design*. 1-204. Loughborough University.

Lilley, D., Lofthouse, V., & Bhamra, T. (2005). *Towards instinctive sustainable product use*.

Lockton, D. (2013). *Design with intent: a design pattern toolkit for environmental and social behaviour change*. Brunel University School of Engineering and Design PhD Theses.

Löwgren, J., & Stolterman, E. (2004). *Thoughtful interaction design: A design perspective on information technology*. MIT Press.

Maani, K. E. (2001). *Systemic Thinking and Complex Problem Solving. A Theory Building Empirical Study*. Atlanta, Systems Dynamics Society.

Macarthur, E. (2006). *Towards the Circular Economy*. *Journal of Industrial Ecology*, 4-8.

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin*, 3-9.

Maglio, P., & Spohrer, J. (2008). Fundamentals of service science. *Journal of the Academy of Marketing Science*, 18-20.

Mahamuni, R. H., Khambete, P., & Mokashi Punekar, R. (2017). *Exploring Distributed Cognition as a Conceptual Framework for Service Design*. *International Conference on Research into Design* (pp. 959--972). Springer.

Mahamuni, R. H., Khambete, P., & Mokashi-Punekar, R. (2018). Behaviour Progression Framework for Designing Sustained Behaviour Change. International Conference on Research Into Design. Bangalore, India.

Mahamuni, R., Kalyani, K., & Yadav, P. (2015). A simplified approach for making human values central to interaction design. *Procedia Manufacturing*, 3, 874-881.

Mahamuni, R., Khambete, P., & Mokashi-Punekar, R. (2018). Service design for behavioural change-current state of the discipline and practice in India. In *ServDes2018. Service Design Proof of Concept, Proceedings of the ServDes. 2018 Conference, 18-20 June, Milano, Italy* (pp. 62-75). Milan, Italy: Linköping University Electronic Press.

Mahamuni, R., Khambete, P., & Mokashi-Punekar, R. (2019). Behaviour Progression Framework for Designing Sustained Behaviour Change. In *Research into Design for a Connected World* (pp. 39-50). Springer.

Mahamuni, R., Khambete, P., Punekar, R., Lobo, S., Sharma, S., & Hirom, U. (2018). Concise Personas Based on Tacit Knowledge - How Representative Are They? *Proceedings of the 9th Indian Conference on Human Computer Interaction* (pp. 53-62). Bangalore: ACM.

Mahamuni, R., Meroni, A., Mokashi-Punekar, R., & Khambete, P. (2019). Empathy Square: An Aid for Service Design for Behaviour Change to Support Sustainability. *Designing Sustainability for All-3rd LeNS World Distributed Conference*. 3, pp. 759-763. Edizioni POLI. design.

Mahamuni, R., Sharma, S., Khambete, P., & Mokashi-Punekar, R. (2017). Reflecting Human Values in Service Design. In *Advances in The Human Side of Service Engineering* (pp. 335-345). Springer.

Mahamuni, R., Sharma, S., Lobo, S., Hirom, U., & Khambete, P. (2018). Quasi-participatory service design in organizational context: A case study. *ServDes2018, Service Design Proof of Concept, Proceedings of the ServDes. 2018 Conference*.

Mahamuni, R., Sharma, S., Lobo, S., Hirom, U., & Khambete, P. (2018). *ServDes2018. Service Design Proof of Concept, Proceedings of the ServDes. 2018 Conference, 18-20 June, Milano, Italy.* (pp. 440-454). Linköping University Electronic Press.

Malazizi, N., Alipour, H., & Olya, H. (2018). Risk perceptions of airbnb hosts: Evidence from a mediterranean island. *Sustainability*, 10(5).

Mamykina, L., Candy, L., & Edmonds, E. (2002, October). Collaborative creativity. *Communications of the ACM*, 10, pp. 96-99.

Mark, G., Lyytinen, K., & Bergman, M. (2007). Boundary objects in design: An ecological view of design artifacts. *Journal of the Association for Information Systems*, 8, 34.

Maslow, A. H. (1970). *Motivation and Personality*. New York: Harper and Row, Publishers.

Matthing, J. (2017). Connected heating cabinets provide an overview of food transport. Retrieved 02 01, 2019, from RISE: <https://www.ri.se/en/our-stories/connected-heating-cabinets-provide-overview-food-transport>

McCull-Kennedy, J. R., Vargo, S. L., Dagger, T. S., Sweeney, J. C., & Kasteren, Y. K. (2012). Health care customer value cocreation practice styles. *Journal of Service Research*, 370-389.

McLellan, H. (2000). Experience design. *CyberPsychology & Behavior*, 3(1), 59-69.

McMahon, M., & Bhamra, T. (2012). 'Design Beyond Borders': international collaborative projects as a mechanism to integrate social sustainability into student design practice. *Journal of Cleaner Production*, 23, 86-95.

MENA Report. (2017). Hong Kong : Speech by SCED at Opening Ceremony of Knowledge of Design Week 2017. London: Albawaba (London) Ltd.

Meroni, A., & Sangiorgi, D. (2011). *Design for services*. Gower Publishing, Ltd.

Merriam-Webster, Incorporated. (1828). Merriam-Webster. Retrieved from Merriam-Webster: <https://www.merriam-webster.com/dictionary>

Michie, S. a. (2014). *ABC of behaviour change theories*. Silverback Publishing.

Michie, S., Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science*, 6(1), 42.

Miettinen, S. (2011). Product design: developing products with service applications. *This is service design thinking: Basics, tools, cases*, 56-67.

Mitchell, V., Ross, T., May, A., Sims, R., & Parker, C. (2015). Empirical investigation of the impact of using co-design methods when generating proposals for sustainable travel solutions. *CoDesign*, 1-16.

Moritz, S. (2009). *Service design: Practical access to an evolving field*. Lulu. com.

Mullainathan, S., & Thaler, R. H. (2000). *Behavioral economics*. National Bureau of Economic Research.

Mummah, S., Robinson, T. N., King, A. C., Gardner, C. D., & Sutton, S. (2016). IDEAS (Integrate, Design, Assess, and Share): a framework and toolkit of strategies for the development of more effective digital interventions to change health behavior. *Journal of medical Internet research*, 18.

Naisbitt, J. (1982). *Ten new directions transforming our lives*. Warner, 63-65.

Neisser, U. (1976). *Cognition and reality: Principles and implications of cognitive psychology*. WH Freeman Times Books Henry Holt Co.

Nelson, H., & Stolterman, E. (2012). *The Design Way. Intentional Change in an Unpredictable World*. Cambridge, Massachussets.

nForm. (2003). Uc Cards. Retrieved from nForm: <https://www.nform.com/>

Nicola, M. (2002). Designing product/service systems: A methodological exploration. *Design issues*, 18, 3-17.

Niederer, K. a. (2014). *Creating sustainable innovation through design for behaviour change: full project report*. University of Wolverhampton, CADRE.

Nielsen, J. (1994, 11 1). How to Conduct a Heuristic Evaluation. Retrieved from Nielsen Norman Group logoNielsen Norman Group: <https://www.nngroup.com/articles/how-to-conduct-a-heuristic-evaluation/>

Nilsson, S. (2010). *Augmentation in the wild: user centered development and evaluation of augmented reality applications*.

Nonaka, I., Takeuchi, H., & Umemoto, K. (1996). A theory of organizational knowledge creation. *International Journal of Technology Management*, 11(7-8), 833-845.

Norman, D. (1988/2002). *The Design of Everyday Things* (Originally published: *The psychology of everyday things*). *The Design of Everyday Things* (Originally published: *The psychology of everyday things*).

Ohamdeo, S. (2012, 06 20). *BASIC PROBLEMS OF HUMAN BEINGS*. Retrieved from speakingtree: <https://www.speakingtree.in/blog/basic-problems-of-human-beings>

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Oxford. (2019). *Dictionary*. Retrieved from Lexico: <https://www.lexico.com/definition>

Papanek, V. (1970). *Design for the Real World: Human Ecology and Social Change*. Academy Chicago Publishers.

Peralta, L., & Rodriguez, C. (2014). *From Product to Service Design: A Thinking Paradigm Shift*.

Petersen, K., Feldt, R., Mujtaba, S., & Mattsson, M. (2008). Systematic mapping studies in software engineering. 12th international conference on evaluation and assessment in software engineering, 17.

Pettersen, I. N. (2013). Changing practices: The role of design in supporting the sustainability of everyday life. 1-578. The Norwegian University.

Pettersen, I., & Boks, C. (2009). The future of design for sustainable behaviour. *Ecodesign*, (pp. 7-9).

PMC Pune. (2017). *Plan for a Modern, Cycle-inclusive Multi-modal Transportation System*. Pune: <https://punecycleplan.wordpress.com/>.

Polaine, A., Løvlie, L., & Reason, B. (2013). *Service design: From insight to inspiration*. Rosenfeld Media.

Prahalad, C., & Ramaswamy, V. (2004). *The future of competition: Co-creating unique value with customers*. Harvard Business Press.

Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of interactive marketing*, 18(3), 5-14.

Prayas Health Group. (2018). Youth in Transition. Retrieved from Prayas Health Group: <http://prayaspune.org/health/index.php/ongoing-research/216-yit.html>

Prendeville, S., & Bocken, N. (2017). Sustainable business models through service design. *Procedia Manufacturing*, 292-299.

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: toward an integrative model of change. *Journal of consulting and clinical psychology*, 51(3).

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American journal of health promotion*, 12, 38-48.

Pullman, M. E., & Gross, M. A. (2004). Ability of Experience Design Elements to Elicit Emotions and Loyalty Behaviors. *Decision Sciences*, 35(3), 551-578.

Reckwitz, A. (2002). Toward a theory of social practices: a development in culturalist theorizing. *European journal of social theory*, 5, 243-263.

Redström, J. (2006). Towards user design? On the shift from object to user as the subject of design. *Design studies*, 27, pp. 123 - 139.

Robertson, C. (1993). *Real World Research: A Research for Social Scientists and Practitioner-Researchers*. Oxford: Blackwell.

Rodriguez, E., & Boks, C. (2005). How design of products affects user behaviour and vice versa: the environmental implications. 4th International Symposium on Environmentally Conscious Design and Inverse Manufacturing (pp. 54-61). IEEE.

Rogers, E. M. (2003). *Diffusion of Innovations*. Free Press.

Rogers, Y. (1997). A brief introduction to distributed cognition. Retrieved July, 24.

Roozenburg, N. F., & Eekels, J. (1995). *Product design: fundamentals and methods*. John Wiley & Sons Inc.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health education monographs*, 328-335.

Russell, C. (1998). *Autoethnography: Journeys of the self*. Retrieved May.

Rust, C., Mottram, J., & Till, J. (2007). Review of practice-led research in art, design & architecture.

Sadler, D. (1998). Formative assessment: Revisiting the territory. *Assessment in education: principles, policy & practice*, 77-84.

Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology* Vol. 21 No. 7, 21(7), 600-619.

Scheuing, E., & Johnson, E. I. (1989). A proposed model for new service development. *Journal of Services marketing*, 25-34.

Schön, D. A. (2017). *The reflective practitioner: How professionals think in action*. Routledge.

Schwartz, S. H. (2007). *Basic human values: theory, methods, and application*. *Risorsa Uomo*.

Seepersad, C. C., Pedersen, K., Emblem SVG, J., Bailey, R., Allen, J. K., & Mistree, F. (2006). The validation square: how does one verify and validate a design method? *Decision making in engineering Design*, 303-314.

Sharma, S., Mahamuni, R., Lobo, S., Das, B., Hirom, U., & Verma, R. (2019). *CraftChange: Behaviour Progression Framework – Evaluation In Quasi Participatory Design Setting*. *Designing Sustainability for All-3rd LeNS World Distributed Conference*.

Sheesley, J. (2008, 07 23). *Destroying the planet one iPhone at a time*. Retrieved from TechRepublic: <https://www.techrepublic.com/blog/decision-central/destroying-the-planet-one-iphone-at-a-time/>

Shostack, G. (1982). How to design a service. *European Journal of Marketing*, 49-63.

Simandan, D. (2013). Introduction: Learning as a geographical process. *The Professional Geographer*, 363-368.

Simanis, E., & Hart, S. (2011). *Innovation From the Inside Out*. MIT SLOAN MANAGEMENT REVIEW , 9-18.

Simonsen, J., & Robertson, T. E. (2012). *Routledge international handbook of participatory design*. Routledge .

Spry, T. (2001). Performing autoethnography: An embodied methodological praxis. *Qualitative inquiry*, 7(6), 706-732.

Stanton, N. A., & Baber, C. (1998). Designing for consumers: editorial. *Applied Ergonomics*, 29, 1-3.

Stappers, P., & Giaccardi, E. (2017). Research through Design. In J. Lowgren, J. M. Carrol, M. Hassenzahl, & T. Erickson, *The Encyclopedia of Human-Computer Interaction*, 2nd Ed. Retrieved October 16, 2019, from <https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/research-through-design>

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social studies of science*, 10(3), 387-420.

Stickdorn, M. (2000). 5 Principles of service design thinking. This is Service design thinking.

Stostack, G. L. (1984, January-February). Designing services that deliver. *Harvard Business Review*, pp. 133-139.

Suchman, L. (1995). Making Work Visible. *Communications of the ACM*.

Sunstein, C. R. (2015). Nudging and choice architecture: Ethical considerations.

Tang, T. (2010). Towards sustainable use: design behaviour intervention to reduce household environment impact. Loughborough University.

Tang, T., & Bhamra, T. (2012). Putting consumers first in design for sustainable behaviour: a case study of reducing environmental impacts of cold appliance use. *International Journal of Sustainable Engineering*, 5, 288-303.

Taras, M. (2005). Assessment--summative and formative--some theoretical reflections. *British journal of educational studies*, 53(4), 466-478.

Taura, T., & Nagai, Y. (2009). A Definition of Design and Its Creative Features. *International Association of Societies of Design Research*.

Te Pai, J., & Pai, S. (2015). User behaviour analysis of the public bike system in Taipei. *International review for spatial planning and sustainable development*, 3(2), 39-52.

Tesla's Electric Cars Aren't as Green as You Might Think. (2016, 03 31). Retrieved 02 10, 2019, from *Wired*: <https://www.wired.com/2016/03/teslas-electric-cars-might-not-green-think/>

Thaler, R. H., & Ganser, L. (2015). *Misbehaving: The Making of Behavioral Economics*. WW Norton New York.

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.

The Economics Times. (2016, 09 09). Building toilets not enough, need behavioural change also for Swachh Bharat: Survey. Retrieved from [economictimes.indiatimes.com: https://economictimes.indiatimes.com/news/politics-and-nation/building-toilets-not-enough-need-behavioural-change-also-for-swachh-bharat-survey/articleshow/54202709.cms?from=mdr](https://economictimes.indiatimes.com/news/politics-and-nation/building-toilets-not-enough-need-behavioural-change-also-for-swachh-bharat-survey/articleshow/54202709.cms?from=mdr)

Thurmond, V. A. (2001). The point of triangulation. *Journal of nursing scholarship*, 33(3), 253-258.

Tofan, D., Galster, M., Avgeriou, P., & Schuitema, W. (2014). Past and future of software architectural decisions--A systematic mapping study}. *Information and Software Technology*, 56, 850-872.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). Design for socially responsible behavior: a classification of influence based on intended user experience. *Design issues*, 27(3), 3-19.

Tukker, A., Emmert, S., Charter, M., Vezzoli, C., Sto, E., Andersen, M. M., . . . Lahlou, S. (2008). Fostering change to sustainable consumption and production: an evidence based view. *Journal of cleaner production*, 16, 1218-1225.

Vargo, S., & Lusch, R. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing*, 1-17.

Vickers, P., & Merkofer, P. (2018). Transitioning from products to services to fuel growth. Retrieved August 16, 2019, from Deloitte: <https://www2.deloitte.com/ch/en/pages/consumer-industrial-products/articles/transitioning-from-products-to-services-to-fuel-growth.html>

Wagle, P. R., Mahamuni, R. H., & Mehta, K. (2019). *Products and Services—Strangers or Siamese Twins? Research into Design for a Connected World* (pp. 75-85). Springer.

Wagner, R. (2017, February 27). Happy Employees Equal Happy Customers? Well, Yes, But It's Complicated. Retrieved from Forbes: <https://www.forbes.com/sites/roddwagner/2017/02/27/happy-employees-equal-happy-customers-well-yes-but-its-complicated>

- Weinstein, N. D. (1988). The precaution adoption process. *Health psychology*, 355.
- Wendel, S. (2013). *Designing for behavior change: Applying psychology and behavioral economics*. "O'Reilly Media, Inc."
- Williams, L. (2016, Sep 18). When Airbnb rentals turn into nuisance neighbours. Retrieved from *theguardian*: <https://www.theguardian.com/technology/2016/sep/17/airbnb-nuisance-neighbours-tribunal-ruling>
- Wynn, C. (2018, Jan 17). To end share-bike dumping, focus on how to change people's behaviour. Retrieved from *The Conversation*: <http://theconversation.com/to-end-share-bike-dumping-focus-on-how-to-change-peoples-behaviour-90016>
- Yee, J. (2009). Capturing tacit knowledge: Documenting and understanding recent methodological innovation used in Design Doctorates in order to inform Postgraduate training provision. *Experiential Knowledge Conference*. London: London Metropolitan University.
- Young, R. (2008). A perspective on design theory and service design practice. *Designing for Services-Multidisciplinary Perspectives*, 43.
- Zbikowski, L. M. (1997). Conceptual models and cross-domain mapping: New perspectives on theories of music and hierarchy. *Journal of music theory*, 41(2), 193-225.
- Zhang, J., & Norman, D. A. (1994). Representations in distributed cognitive tasks. *Cognitive science*, 18(1), 87-122.
- Zomerdijk, L. G., & Voss, C. A. (2010). Service Design for Experience-Centric Services. *Journal of Service Research*. doi:10.1177/1094670509351960

Appendices

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Appendix 1

Reflecting
Human Values
in Service
Design.
AHFE16,
Orlando,
USA2016

Reflecting Human Values in Service Design

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Abstract. Services are dynamic, unfolding over a period of time through a sequence of events and steps that produce value for the customer. A key contributor to the value of service is the experience of interpersonal interactions. Designing services that result in desirable experience and motivate customers to sustain the customer loyalty is challenging. Human centered approach towards service design captures the deep insights of customer expectations. However, human values i.e. beliefs exist at a deeper and more subconscious level in a customer as a human, than his expectations as a service consumer. Hence there is a need to understand and realize human values e.g. empowerment, motivation, and awareness of the customers to reflect exactly what customers want from the service. Design patterns provide a structured yet creative method for service design. This research paper elaborates the use of service design patterns as effective enabler incorporating the human values in service design solutions through findings of two case studies.

Keywords: Service Design · Human Values · Design Patterns · Pattern Language

1 Introduction

Services nowadays dominate the global economies and economic growth. Along with rising importance of services, they are becoming much more complex with the developing technologies and shift in customer expectations. Traditionally services are thought primarily from service management perspective where, operational characteristics of services like efficiency, effectiveness and smooth flow of the process are given importance during their design. Now, there is a need to consider services primarily from customers' and then service providers' perspective. Service providers can no longer be in competition solely on providing superior value through their core products, rather they must move towards creating meaningful and memorable cus-

customer experiences as their differentiator. Service providers, particularly social ventures, must shift the focus from operational qualities of services to customers' unstated needs, aspirations and what they value in their lives.

Service design helps service providers to devise a strategic positioning for their service offerings. It aims at applying design principles and methods to create services that are useful, usable and desirable to the customers. Designing customer-centered services requires a deep understanding of customers' life contexts, goals, expectations and human values that they cherish. Human values are beliefs or ideas about what is desirable in a particular context and situation. These are the fundamental virtues which make us human and play a significant role in guiding all our actions, judgment and decisions [1]. It is therefore reasonable that, human values which lie very close to the heart of people, have significant impact on their expectations from a service in a given context. Hence, there lies a need to consider human values of customers while designing the services for better customer experience.

Service providers use a variety of ways, such as process design, culture building and training through which they ensure adherence to human values. However, it would be beneficial if the design of their service Touch Points and Service Encounters embeds human values. Design patterns and pattern languages can ensure that this is accomplished effortlessly as a natural outcome of the design process.

A design pattern provides solution to a recurring problem and is a structured way of documenting the underlying principles in good design practices, and providing actionable design guidance [2]. While an individual pattern solves a problem, a system comprising a network of them i.e. a language, helps in solving complex design problems. Use of patterns and pattern language in a range of disciplines, including architecture, interaction design, usability engineering, and computer supported collaborative work (CSCW) and software engineering has been tried from long while. It led to generation of many solution ideas to handle a recurring problem right from the early stages of designing. Moreover, patterns and pattern languages are based on user-centric thinking.

So we propose the creative usage of service design patterns which map to relevant customer values to create value-centric services for customers. In this paper, we also describe two case studies to validate this approach towards human value centric service design for better customer experience.

2 Related Work

Service design is "the activity of planning and organizing people, infrastructure, and communication and material components of a service in order to improve its quality and the interaction between service provider and customers" [3]. Service Design involves designing interactions (between the customer and the service interfaces, or Touch Points), relations (among the Touch Points and entities that are part of the service system) and experiences of the customer [4].

Retaining the human-centered perspective of the services introduces complexity in the design process. Research on human issues in service design depicts the importance of understanding fundamental behavioral science principles that underlie human interactions in service design for better customer experience [5]. Sangiorgi and

Junginger [6] also, while highlighting the emerging issues in service design, indicated that service design should now focus on aligning business values with what customer value in their life.

The Values Theory defines human values as desirable, trans-situational goals, varying in importance that serves as guiding principles in people's lives [7]. Most often these values are not mentioned explicitly, but nonetheless they drive our behavior both as individuals and as a society. In human computer interactions field, researchers have talked about the need to make human values central to the interaction design [8]. Naisbitt said "We must learn to balance the material wonders of technology with the spiritual demands of our human nature"[9]. This brings out the need to understand customer values and realize these human values in the process of service design and reflect in the service design specifications.

A pattern language was used by Christopher Alexander to design houses and buildings in architecture and a multidisciplinary approach [10]. Patterns and pattern languages have been proved to be useful in various disciplines like Software Design [11], Interaction Design [12], and Service Design [13]. Khambete proved the usefulness of patterns and pattern language for designing services with the help of multidisciplinary approach [13].

Despite the awareness and multiple existing approaches, human values realization in service design through pattern language is not evident. So there is a need for the service design approach using pattern language which naturally implies the consideration of customer values to retain the human-centeredness of the service.

3 An approach towards Service Design

This section explains the approach taken towards customer-centric service design and the further sections describe the case studies with this approach.

While taking customer-centric approach towards service design, we need to understand the potential users of the service, understanding their behaviors, needs and motivations. The user research for this can be done through exhaustive observation techniques and certain feedback methodologies. Based on user research, personas are formed which represent profiles that summarize the features of an existing group of users in empathetic form. Social, cultural and demographic characteristics of users are taken into account along with their desires and habits, while identifying personas. While focusing on core needs of human beings, all the significant human values of these personas which should be satisfied by the service are identified. These human values can even be prioritized for better customer-focused design.

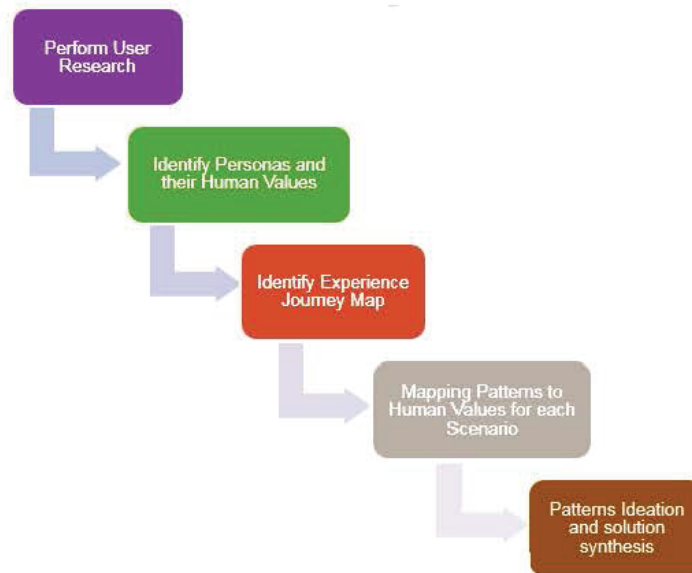


Fig 1. Service Design Approach

After collaboratively and iteratively creating personas and service encounter scenarios based on the data, creating Experience journey map is the next logical step. Experience journey map is nothing but an illustration of how customer engages with the service. Service experience journey maps are created to depict the service encounter stages, goals and sub-goals at each stage. At each stage, the applicable patterns are identified which map to the identified human values of customers. A pattern can map to one or multiple human values of personas. The design guidance from the chosen pattern set is used for ideation and synthesizing several solution ideas. Conceptual design of service encounters and interactions between various touch points is the final outcome of the service design, where touch points are the human or non-human entities with which user interacts and service encounter is a scenario in which user interacts with several touch points to accomplish a goal.

4 Corporate Services Case Study : Recruitment through Employee Referrals

Organizations offer facilities to their employees, and need employee participation in several initiatives. However, they rarely treat them as “customers” of services being offered. This case study focuses on reimagining incentive based employee referral for recruitment in a large IT Services organization which was framed as “service” to the employees. The aim was to improve the perception of this service among employees, and facilitate a desirable experience of referral so that the business objective of high-quality recruitment at scale could be met. The key areas to focus were identified as creating delightful user experience, improve the perception of employee referral sys-

tem among employees as an effective channel for referral and build awareness of employee referral program. Participants in this case study were service owners, developers of the technology platform used for recruitment and solution implementers. Service designers acted as facilitators and service design patterns acted as enablers throughout the project.

The case study started with the discussions to understand the current employee referral service and its problems. For redesigning the service for satisfactory customer experience, designers focused on user research in terms of various employee interviews to understand their personality characteristics, motivation factors and their opinion about current employee referral service. Analysis and discussions over the data collected from interviews lead to identification of two distinct personas and their human values. Following is the list of identified significant human values of employees.

Motivation: Internal and external factors that stimulate desire in people to be continually interested and committed to a job.

Awareness: Knowledge or perception of a situation or fact.

Empowerment: The degree of autonomy and self-determination in people

Cooperation: Assistance to perform a task.

Appreciation: Recognition of anything good.

Benevolence: Preserving and enhancing the welfare of those with whom one is in frequent contact [7]

Freedom: Right to act freely

A set of scenarios and experience journey maps that would capture the understanding of the real life situations were identified. At each stage in customer journey map, patterns to be used to incorporate all the identified human values were decided. The design team referred to pattern cards as well as the MS Excel based pattern repository while deciding the patterns applicable for each human value. The pattern cards and repository contained all the information about the pattern such as pattern name, description and examples of how to implement the pattern.

One of the examples of how the patterns were selected and ideated for particular identified human values is: The pattern 'Rich Lifetime Memory' [13] triggered an idea of having Referrer Award Ceremony in which top referrer will be awarded in order to increase participation and realize the human values *Motivation* and *Benevolence* of employees as referrers. For the same purpose, we also proposed some simple methods like giving messages (like "Missed you on employee referral system – We have found something for your buddy!") to employees, so as to make them aware of the new requirements in organization, relevant to their buddy profiles as well motivate them to visit employee referral system often. Another example where designers identified pattern 'Freedom to choose from wide range of touch points'[13] to realize values such as *Freedom* and *Empowerment* and suggested to link employee referral system with social networking sites. Employees hence won't need to login to employee referral system every time to refer to be employees.

Lots of other design decisions were taken to incorporate human values like *Cooperation* and *Awareness*: Facility to connect using emails, calls, messages with community or a missed call (Pattern: Ease in seeking help [13]), Providing Facebook page

of the company for grievance redress (Pattern: Ease in seeking help [13]), Showcasing pictorial view of the journey the buddy will go through (Pattern: Easy comprehension of the encounter flow, Pattern: Role clarity [13]), Visual representation of the process flow at the time of creating buddy profile (Pattern: Easy comprehension of the encounter flow, Pattern: Role clarity [13]).

5 Healthcare Services Case Study: Designing maternal healthcare services in Rural India

A majority of people in India live in rural areas where the condition of medical facilities is grievous. Though a lot of policies and programs are being devised by the Indian Government to help improve the condition of rural healthcare, the success and effectiveness of these programs is questionable. There is no specific design approach used for application of the new policies and techniques [14]. Mother and child healthcare services in the rural population provided by a Primary Health Centre (PHC) located in Thane district, Maharashtra, India were selected for our study of service design. Khambete et al. explained the executional process of this case study and described how patterns were found useful for better design of rural healthcare services [15][16]. In this case study, participatory design approach was used while considering human values of people and designing services accordingly through patterns and pattern language.

Doctors and staff members, IT professionals, business analysts, a psychologist and a sociologist were involved in the participatory team of design. Initially they were familiarized with the concepts of service design, pattern language, human values, user experience and other terms related to our service design approach, such as persona, service encounters, touch points and experience journey maps. Workshops were held where, participants played out with pattern cards by creating real life scenarios and they observed how usage of patterns corresponding to respective human values could evolve into better design.

Multiple discussions were held especially to understand the challenges and constraints in rural areas like access to the healthcare facilities, communication barriers and poverty. User research was done through field visits where methods like participant observation, shadowing an immunization team conducting an immunization camp and semi structured interviews were used. With this research and field experience of doctors, two personas were identified along with their important human values, some of which are listed down below.

Security: Safety, harmony, and stability of society, of relationships, and of self. [7]

Traditionalism: Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion has set down in the past. [7]

Awareness

Motivation

Empowerment

Accomplishment: Activities which a person can do well.

A service scenario validated by the doctors and sharable experience journey maps depicting service encounter stages and sub goals at each stage were created. Keeping in mind the human values of the service users, the patterns had to be selected for each scenario. Two teams of approximately 3 to 4 people were decided to come up with the list of relevant patterns in the scenario, corresponding to each human value. The teams referred to pattern cards as well as the MS Excel based pattern repository while deciding the patterns to be used. These selected patterns were then refined and used in ideation and solution synthesis.

For example, we could empower (*Empowerment*) illiterate people, while also keeping their traditional customs (*Traditionalism*) in mind, to easily assess whether the post-immunization fever is in the normal range, and to seek medical attention if needed (*Accomplishment*). It is common in rural culture to have babies wear a bead bracelet as an auspicious charm. The context was used to think of a wearable, visual body temperature indicator, which helped illiterate mothers to easily assess body temperature of their babies and call for medical help whenever required.

Another scenario was mother taking her child for vaccination to the vaccination camp. To remind about the date of vaccination, while looking at the pattern 'Well Trained Customer', designer team suggested that calendar like 'Kalnirnaya' with marked dates of vaccinations could be used as it is something which is present in all the houses. This helped in realizing values of mothers like *Traditionalism* and *Empowerment*. While realizing the value *Awareness*, designers suggested usage of patterns 'Well advised customer', 'Service failure anticipated' [13] and ideate these patterns in terms of proper counseling about the fever and other side effects of vaccines. Hence mothers could know which vaccine causes fever and the fact that only 8 out of 10 children face this problem. A video or a booklet with pictures could be designed that would inform mothers and keep them prepared of the side effects of vaccination. This helped incorporating values such as *Security* and *Awareness* through the usage of pattern 'Prevent harm' [13]. Also it was decided to give priority of vaccination to those mothers who could not get her child vaccinated before, due to shortage of vaccines or some other problem at that time (*Benevolence*). Many other such design decisions were taken in order to improve this service, through usage of patterns.

6 Observations from the Case Studies

The proposed approach towards service design is used in two case studies mentioned above. This approach involves usage of patterns and pattern language to transform the identified human values exactly into the designed service so as to create delightful customer experience.

Human values are generally not mentioned explicitly by anyone. Extracting out the human values through various user research techniques helped us to concretize what we need to focus upon during whole process of service design, in order to enhance the customer experience.

The usage of pattern language in our case studies helped in driving the thought process of designers in a particular direction and in a more structured way. At the same time, it also triggered new ideas specific to the problem at hand, leading to creative solutions to the problems. The patterns were selected by referring to their names,

descriptions, examples and observing which human values the pattern caters to. The identified patterns set was refined during the discussions within design teams. The final patterns set used in the case studies effectively catered to identified human values of the service customers.

7 Human values and Design Patterns

A comprehensive list of patterns corresponding to important human values is mentioned in below Table 1. However this list is not complete with respect to human values identified till now by the past research as well as patterns [13].

Table 1. Human Values and Patterns

Human Values	Pattern Name
Traditionalism	Consistency among Touch Points
Privacy	Credible Privacy Assurance
Motivation	Active Wish List, Encounter Triggered by Provider, Rich Lifetime Memory
Benevolence	Civil Behavior, Rich Lifetime Memory Customer Behavior Corrected Politely, Interactions Build Trust,
Security	Agreeable Constraints that Prevent Harm, Credible Privacy Assurance, Prevent Harm, Feeling Secure, Timely Redress of Grievance
Empowerment	Anthromorphic Touch Points, Interactions Build Trust, Freedom to Choose from Wide Range of Touch Points
Freedom	Freedom to Choose from Wide Range of Touch Points, Customers can Track Progress, Deferred decisions, Service Failure Anticipated, Well Trained Customer
Awareness	Artefact Provides a Progress Trail, Authentic Information on Demand, Customers can Track Progress, Intimations, Well Advised Customer, Progress Indication, Easy Comprehension of the Encounter Flow
Cooperation	Directing to a Suitable Touch Point, Ease in Seeking Help, Human Touch point on Standby, Easy comprehension of the encounter flow, System Intelligence,
Accomplishment	Service failure anticipated, Well trained customer, Directing to a suitable touch point, Ease in Seeking Help, Human touch point on standby, Easy comprehension of the encounter flow
Appreciation	Rich Lifetime Memory

8 Conclusion

Several theoretical and practical aspects concerning human values, effectiveness and use of the specific pattern language employed in the study and pattern languages in general were confirmed and new knowledge was discovered. Several findings below relate to the human values and Design pattern language, but are generalizable to any service design. To briefly summarize:

- The advantages of a specific attention to the customer human values for service design was underscored on several counts (e.g. contribution to enrichment of the design, continuous empathy).
- The pattern language used in the study appears to be communicative of human values and can serve as a shared, discipline agnostic means of human values communication for service design.
- The effectiveness and usefulness of patterns and pattern languages as human value design enablers for service design was established.
- The pattern language supported a structured yet flexible design process to enable human values by augmenting the creative possibilities.

The research design of our study was comprehensive. We used a mix of quantitative and qualitative methods, two distinct service design problem areas and varied subjects and design settings. These factors significantly validate the conclusions. Literature study suggests this is arguably first such comprehensive study which used a well-developed pattern language to realize the human values. Therefore, it significantly adds to the knowledge about human values, patterns, pattern languages as well as service design.

9 Directions For Future Research

Design practitioners' understanding of patterns increases through use. Considering the complexity involved in identifying human values, fruitful research could be carried out in identifying the way pattern language can be useful in identifying the customer human values during user research.

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References

1. Harper, R., Rodden, T., Rogers, Y., Sellen, A.: *Being human: Human-computer interaction in the year 2020*. Cambridge, UK: Microsoft Research Ltd. (2008)
2. Athavankar, U., Khambete, P., Roy, D., Chaudhary, S., Kimbahune, S., Doke, P., Devkar, S.: *Multidisciplinary Team Dynamics in Service Design-The Facilitating Role of Pattern Language*. In *Proceedings of the India HCI 2014 Conference on Human Computer Interaction* (p. 16). ACM (2014)
3. Fensel, D., Facca, F.M., Simperl, E., Toma, I.: *Service science*. In *Semantic Web Services* (pp. 25-35). Springer Berlin Heidelberg (2011)
4. Meroni, A., Sangiorgi, D.: *Design for services*. Gower Publishing, Ltd. (2011)
5. Cook, L.S., Bowen, D.E., Chase, R.B., Dasu, S., Stewart, D.M. and Tansik, D.A.: *Human issues in service design*. *Journal of Operations Management*, 20(2), pp.159-174 (2002)
6. Sangiorgi, D., Junginger, S.: *Emerging Issues in Service Design*. *The Design Journal*, 18(2), pp.165-170. (2015)
7. Schwartz, S.H.: *Basic Human Values: theory, methods, and application*. *Risorsa Uomo*. (2007)
8. Mahamuni R., Kalyani K., Yadav P.: *A simplified approach for making human values central to interaction design*. *Procedia Manufacturing*, 3, pp.874-881. (2015)
9. Naisbitt, J.: *Ten new directions transforming our lives*. Warner: New York, 63-65. (1982)
10. Alexander, C., Ishikawa, S., Silverstein M.: *A Pattern Language: Towns, Buildings, Construction*. Vol. 2. Oxford University Press (1977).
11. Gamma, E., Helm, R., Johnson, R., Vlissides, J.: *Design patterns: elements of reusable object-oriented software*. Pearson Education India (1994)
12. Borchers J.O.: *A pattern approach to interaction design*. *Ai & Society*, 15(4), pp.359-376. (2001)
13. Khambete, P.: *Designing Desirable Service Experience: A Pattern Language Framework for Designing Touch Point Ecosystems*. Indian Institute of Technology Bombay (2013)
14. Park, K.: *Park's Textbook of Preventive and Social Medicine*, 21st edn. Banarasidas Bhanot, Jabalpur (2011)
15. Khambete, P., Roy, D., Devkar, S.: *Validation of a Service Design Pattern Language as an Effective Framework for Multidisciplinary Design*. In *Proceedings of the 7th International Conference on HCI, IndiaHCI 2015*, pp. 1-9. ACM (2015)
16. Khambete, P., Athavankar, U., Doke, P., Shinde, R., Roy, D., Devkar, S., Kimbahune, S. and Chaudhary, S.: *A Case Study in Participatory Service Design for Rural Healthcare System in India Using a Pattern Language*. In *ICoRD'15—Research into Design Across Boundaries*. Volume 1, pp. 3-13. Springer India (2015)

Appendix 2

Participatory
Service
Design for
Reimagining
Corporate
Services: A
Case Study

20th DMI: Academic Design Management Conference
Inflection Point: Design Research Meets Design Practice
Boston, USA, 22-29 July 2016



Participatory Service Design for Reimagining Corporate Services: A Case Study

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Service Design is an evolving discipline where Service designers adopt a customer centric perspective, holistically addressing all components of the service system – human, technology and business - aiming to create desirable experiences. In such situations, participatory design is an established paradigm in which the end-users and other stakeholders contribute actively in the design lifecycle. Organizations offer facilities to their employees, and need employee participation in several initiatives. However, they rarely treat them as ‘customers’ of services that are being offered. The scope of this case study was to reimagine an incentive based employee referral for recruitment in a large IT Services organization, which was framed as a ‘service’ to the employees. Participants in our design project were service owners, developers of the technology platform used for recruitment and solution implementers. Service designers acted as facilitators and service design patterns acted as enablers throughout the project.

This case study demonstrates that the use of participatory service design along with pattern language has a longitudinal effect on the participant’s perspectives to look at problems and their solutions. It also has the impact on the service system acceptance in the organization.

Keywords: Participatory design; service design; corporate services; pattern language, incentive based employee referral, large IT services organization

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Introduction

We live in an era where specialized knowledge workers need one another's help to get things done. Therefore, to succeed in today's highly dynamic and networked world, employees of organizations need to master the art of collaboration. Collaboration is essential but it has its own challenges such as conflict and disagreement in the team, bureaucratic tangles, departmental wrangling, and snail-paced decision-making. Collaboration invariably fails due to fundamental differences among business functions (Weiss & Hughes, 2005). For successful collaboration, the process must ensure that every contributor's voice is heard and acknowledged. Collaboration should not be confused with cooperation or teamwork. The latter requires sharing of knowledge and allowing visibility of individual action, but it does not involve interaction, debate, and working together towards a common goal (Campbell, 2011). Collaboration can rejuvenate organizations by fully engaging its employees, which in turn improves employee retention and increases the organization's innovation culture (Kelly & Schaefer, 2014). Building blocks of effective collaboration that leads to these outcomes are trust, communication, a shared vision and a purpose. These aspects of collaboration are crucial not just for creating value for the customers, but also for engaging with the employees through the internal services (for example, internal IT, talent acquisition, employee self-services). The employee acceptance of and satisfaction with the internal services can crucially depend on treating them as the internal 'customers'. The functions (for example, Human Resources, Finance, Administration and so on) act as service providers to the customers, that is, the organization's staff. Design of such services calls for Human-centered design (HCD) paradigm and specifically Service Design, an emerging discipline that embodies the HCD ethos and Experience Design principles.

Services are becoming complex with dependence on the emerging technologies and the shifts in customer expectations. It is not enough to only fulfil the customer's utilitarian expectations, but also to create a delightful experience. This calls for viewing the services primarily from the customer's perspective and then the service provider's perspective. Rather than focusing on the operational and economic goals like efficiency, costs and effectiveness, the primary orientation of the service providers should be to design services, which will lead to pleasing experiences. Service Design is an experience centric approach to develop strategic service offerings that are useful, usable and enticing to the customers.

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The theoretical foundation of service design is still evolving and maturing (Sangiorgi, 2009). Service Designers adopt a customer centric perspective, holistically addressing all components of the socio-technical service system that is, human, technology and business; aiming to create desirable customer experiences. As services are multidimensional, complex, intangible, heterogeneous and have a temporal component, their design requires synthesis of multidisciplinary perspectives (Kimbell, 2011). Designing customer-centric services requires a deep understanding of customers and their expectations. It is also important to know the way customer experience gathers over time through multiple interactions at different interaction points.

Service design involves multidisciplinary collaboration, but it comes with its own challenges such as diverse backgrounds, knowledge, expertise, and maturity of the participants which need to be addressed. A common language or vocabulary should be available to exchange the ideas effectively within the team. This may also help effectively engage participants in a process that involve the creative conceptualization, implementation and evaluation (Mamykina, Candy, & Edmonds, 2002). Participatory Design is an established paradigm in such situations in which end-users and other stakeholders contribute actively in the design lifecycle. Effective participatory service design methods need to pay attention to design outcomes as well as to the participants and their collaboration.

Halskov and Hansen reviewed Participatory Design and Research literature, and identified the fundamental aspects such as politics, people, context, methods and product (Halskov & Hansen, 2015). It is important to have a mechanism to enable communication and coordination among the participants to manage these aspects, thereby enabling the synthesis of their unique, varied kind of knowledge (Fischer & Shipman, 2011). Service design patterns could serve as one of the mechanisms to address this in the service design life cycle (Khambete, 2013).

Design patterns and pattern languages (Alexander, Ishikawa, & Silverstein, 1977) abstract the similarities in the successful solutions to the recurring problems in a domain and provide guidance for creative design solutions. A design pattern is a structured way of capturing the basic principles governing the 'best' design practices and offering actionable design guidance to practitioners, which can be implemented to match the situation on hand (Athavankar, et al., 2014). As compared to prescriptive guidelines, patterns and pattern languages allow adaptation and encourage

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creativity. While an individual pattern solves a specific problem, a pattern language that is, a network of patterns, helps in solving complex design problems, which are usually a collection of interlinked problems. Patterns and pattern language have been in use since long in a range of disciplines, including architecture, interaction design, computer supported collaborative work (CSCW) and software engineering. They provide a 'Metadesign environment' (Giaccardi & Fischer, 2008) for effective collaboration. According to Thomas et al. (Thomas, Lee, & Danis, 2002), a pattern language offers a productive socio-technical system with a flexible structure that can facilitate creative solution finding. They serve as a *lingua franca*, offering a multi-disciplinary vocabulary (Erickson, 2000).

Table 7 Fundamental Aspects of Participatory Design (Halskov and Hansen, 2015)

Politics	People who are affected by a decision should have an opportunity to influence it.
People	People play critical roles in design by being experts in their own lives.
Context	The use situation is the fundamental starting point for the design process.
Methods	Methods are means for users to gain influence in design processes
Product	The goal of participation is to design alternatives, improving quality of life.

This case study focuses on reimagining an incentive based employee referral scheme ('Bring your Buddy') for recruitment in a large IT Services organization. The firm employed over 300,000 people, with consistently strong year on year increase in employee strength. The team believed that the effectiveness of the existing scheme can be enhanced significantly by framing it as a 'service' to the employees. The aim was to build greater awareness of this service among employees and offer a delightful referral experience in order to improve their attitude towards the service. The organizational objective was to achieve wide-scale acceptance and usage so that the requirement of high-quality recruitment at scale could be met. To achieve this, the design team was formed comprising 'customers' of this service that is, employees of the organization; service owners, that is, a representative from the talent acquisition group, and developers of the technology platform and solution implementers. The sections that follow

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elaborate how this type of team composition and the design approach benefited in the service design endeavor.

Designing Organizational Services

Some of the service characteristics are: intangibility, simultaneous production and consumption, heterogeneity, and complexity of the delivery systems. As such the perceived value of services are contextual and differ from person to person. The organizational services also exhibit the same characteristics. Most organizations focus on the externally oriented customer centric service design to have satisfied customers. However, they often neglect to apply the same approach to services offered to their employees. However, there is a direct correlation between positive employee attitude and an organization's business performance (Koys, 2001). Particularly, the kind of service we examined called for relied on fostering the sense of 'organizational citizenship', another key element that contributes to business success (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Clearly, it was important to adopt human centric design of an organization's internal services that are desirable to the employees and perceived as valuable.

Centrally developed innovation, and by extension new practices can be successfully integrated in an organization if the end users are linked to the development process. This suggests the environment in which their perspectives are incorporated in the innovation through 'shared and organic (developing, adaptive) understanding of the value and impact' in use (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004).

It was necessary to take into account the aspects of technology adoption when designing services in which technology based Touch Points might have a significant role. Technology acceptance model (TAM3) (Venkatesh & Bala, 2008) positively links perceived usefulness and perceived ease of use to adaption of technology by the end users. The determinants of perceived usefulness and perceived ease of use to be:

- Individual difference: personality, demographics, access to relevant information
- System features that can help mould an individual's perceptions about the usefulness and ease of use
- Social influence
- Facilitating conditions

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Studies have identified other aspects of the technology acceptance model, indicating that design characteristics of a system and related information design are determinants of perceived usefulness as well as perceived ease of use (DeLone & McLean, 1992), (DeLone & McLean, 2003), (Wixom & Todd, 2005). The several facets mentioned above point to the need of human centered design for effective adoption of new services within organizations.

Employees that are provided opportunities to be responsible organizational citizens can make significant contribution to initiatives through voluntary participation. As stated previously, we treated the employees as 'customers' of the incentive based employee referral 'service' for recruitment in a large Indian IT Services organization services. Further, we blended human centric service design and participatory design through end-to-end active participation of employees in various roles. The approach enabled us to address a range of issues and possibilities, concerning the design process and the outcomes.

Methodology

Domain Familiarization and Data Collection

Participants in our design project were customers of the service (associates at large), service owners (recruitment function), developers of the technology platform used for recruitment and the implementers. Service designers acted as facilitators throughout the project. Initially, the Service designers who belonged to the partner academic institution were sensitized about various aspects of recruitment through employee referrals and the challenges such as the lack of communication, unawareness and lack of enthusiasm among employees. Subsequently, three workshops were held in which all stakeholders participated in order to familiarize them with the human centric service design concepts as well as to capture the explicit and tacit knowledge and data they possessed. The workshops were a critical component of the approach as they enabled the stakeholders to collectively reframe the platform as 'service', reach consensus on the service experience goals, contexts and issues they are currently facing. The data collection strategy was finalized as well through consensus. As such the participatory philosophy was followed from the earliest stages.

The data collection was done through semi structured interviews with all types of key stakeholders, that is, employees with different experience

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levels, human resource representatives and beneficiaries that is, the talent acquisition group members.



Interviews were conducted in Indian cities – Pune, Mumbai, Chennai and

Figure 9 Illustrative Pictures for Domain Formalization and Data Collection

Hyderabad by four different teams of two or three members. Care was taken that at least one member had expertise in qualitative interview method. Together 40 interviews were conducted spanning the representative cross section of the ‘customers’ (for example, people who had been referring friends frequently to who had not referred ever, senior to junior associates and so on...). In view of the organization context, complete anonymity was ensured. The collected audio recordings, photographs, interview notes were analyzed during subsequent workshops, which resulted in identifying the key contexts, service encounters and personas. To illustrate: it was discovered that the enhancement and protection of social capital, that is, ‘goodwill that is engendered by the fabric of social relations and that can be mobilized to facilitate action’ (Adler & Kwon, 2002) was far more critical to the referrer than the monetary incentive. This indicated an untapped opportunity to design a service that fulfills such aspirations. It was also discovered that the associates found workarounds to the ‘prescribed’ process to protect their social capital. Instead of treating it as a process non-compliance, we reframed the situation in the spirit of human centered design as an opportunity to appropriate the workarounds in the service design.

Application of the Pattern Language

As part of the preparatory workshops, the team was familiarized with the overview of the concepts in design, service design, and the pattern language. The design methods and techniques to create artefacts like persona, scenario and customer journey maps were also introduced. Nine

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full day workshops were conducted over a period of four months. During these workshops, the team worked in groups and as individual contributors. Participants were allowed to be present for full or part time during these workshops to take care of their other priorities. This reflected conformance to the real life conditions of voluntary participation and enhanced the ecological validity of the findings of the study.

The steps followed were:

1. Multiple preparatory workshops conducted to introduce design concepts, methods and techniques
2. Personas, Key Scenarios and Customer Journey Maps creation: The multidisciplinary team collaboratively and iteratively created two personas representing the two predominant behavioral archetypes that emerged from the data (Kalyani, a junior software engineer representing a more common type of referrer; and Sumitra representing a managerial type of referrer, a less common but important stakeholder from the organization's perspective). Data indicated that the referrers are more likely to refer a close friend, and are keen to protect their professional aspirations and future welfare (for example, ensuring the match between their and the organization's requirements). We therefore created a realistic scenario of an associate (Kalyani, in this case) referring a former friend from her college. A customer journey map was created (Table 2) based on the insights from the primary data to depict the following:

- Service encounter stages (namely: Readiness to refer, Receiving and acting on a Trigger, Referring a Buddy, Waiting for the outcome and proximate Post Outcome Period).
- Goals at each stage indicating what the selected persona(s) will achieve at the end of this stage for example, motivation and ability to refer; decide suitability both ways.
- Expectations of the selected persona(s) during this stage for example, I should be able to get to know right stakeholders; I should be able to complete the process with least effort.
- Thinking captures what the selected persona(s) will be thinking during this stage for example, 'Am I capable of handling the trigger? How to establish suitability quickly?'
- Feeling captures what the selected persona(s) will be feeling during performing the activities in this stage. For example, feel good, sense of satisfaction, anxiety, helplessness and so on.

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- Doing captures what the selected persona(s) will be doing during this stage for example, doing routine work; mentoring and advising the buddy; sharing experience with friends.
- Decisions captures what decisions will the selected persona(s) taking during this stage. For example, decide to act on the trigger; no decisions and so on.
- Context captures the related possible context for this stage for example, Many things are happening behind line of visibility; candidate is looking to switch job in short timeframe
- Resources captures the resources available during this stage for example, Mobile phones; friend circle; social network, internet
- Service Failure causes captures the possible failure causes during this stage for example, lack of communication; ineffective communication channels; technical glitches; system usability issues

Persona posters and journey maps produced at this stage were the sharable artefacts. Evolution of these artefacts happened in the subsequent phases iteratively.

Table 8 Customer Journey Map Template

	Stage-1	Stage-2	Stage-3	Stage-4	Stage-n
Goals						
Expectations						
Thinking						
Feeling						
Doing						
Decisions						
Context						
Resources						
Service Failure Causes						

3. Mapping Patterns to a Customer’s Journey Map (CJM): A service design pattern language (Khambete, 2013) comprising 116 patterns were used in the design. After creating the customer journey map depicting various stages involved, the team identified the applicable design patterns. During this case study, the design patterns the team used pattern cards (figure 2) (Athvankar, et al., 2014) which provided a handy overview.

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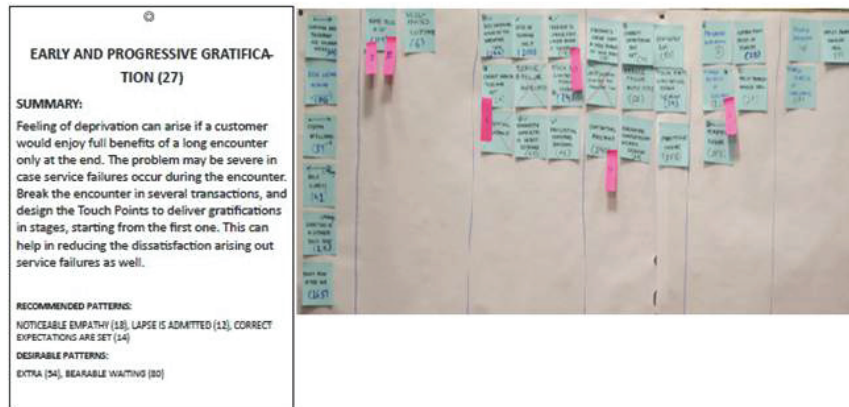


Figure 10 An Example of Pattern Card and Identified Patterns in Stages of CJM

The detailed pattern language was also available for reference when needed. Two teams of four members each independently worked on the scenario with different personas and assigned patterns using pattern cards to each stage in the customer journey map. During this stage, the facilitators played a crucial role to provide the required guidance when requested. Through informal discussions, the team associated the design patterns after arriving at a common understanding.

4. Refining Selected Pattern and Customer Journey Map: The patterns set identified in the third stage was refined throughout the process with deletion or addition of design patterns. During this process, connected patterns were also used for holistic design guidance.

5. Ideation and Solution Synthesis: After refined CJM and design pattern association, solution ideas were generated and noted for each stage of CJM and sometimes across the stages. The ideas were generated based on the selected design patterns. In general, each design pattern triggered several solution ideas, based on the pattern guidance as well as through analogy. This ideation process was iterative and ideas evolved over a period of time. Ideas like 'attach reward amount to a social cause', 'Green channel for high concerned buddy', and 'engaging with candidate from offer to joining stage' were discussed during this phase.

Ideation process generated a lot of ideas across every stage. Some of them were worth pursuing on their own (for example, BYB champion at each office location), and some in combination with others (for example, transparent process). In order to trigger additional innovative solutions, we decided to clusters representing the idea themes (for example, rewards).

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This as well proved beneficial. For instance, data had indicated the importance of non-monetary, 'emotional' gratification. This led to the concept of immediate token reward of free coffee to self and friends followed by donation to a charity by the company on behalf of the referrer. The approach as well helped in converting ideas into implementable and viable service experience concepts. Externalization through post-its were used for the affinity building through discussion and progressive refinement till a common understanding was formed.

6. Insight Consolidation: All the artefacts created through previous phases were used to build and arrive at a common understanding and insights. The team shared their experiences related to working in a multidisciplinary team and how the externalization of information helped. This consolidated information was used for a handover of consolidated insights, that is, some form of service specification.

7. Insight Sharing: Due to unavoidable circumstances, not all participants could participate throughout the project. The consolidated insights were shared with the entire team for complete understanding and endorsement.

Revisiting the Same Multidisciplinary Team to Understand Longitudinal Effect

We revisited this service design team after a gap of six months to understand the participants' experiences after the service design project. During this visit, we refreshed their memory by narrating the overall process along with the in-process artefacts and the actual photographs. During the participants' semi-structured interviews, they reflected on their involvement and feelings about the project. It helped develop organizational expertise and creativity, where the service design attitude, process and use of pattern language were imbibed in the participants and they were able to practice it regularly.

Over All Insights and Discussion

The consolidated insights are logically grouped together for a better understanding though several of them can be a part of more than one group.

Patterns and Pattern Language

Understanding of the design patterns is the basic requirement for its effective utilization. Generally, the pattern name, brief summary and

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examples of implementation are adequate to gain understanding of the design guidance. Pattern 'NAMES TELL A LOT' suggests to use names that can convey function, experience of interacting with it and the outcome and are easily comprehensible. All pattern names are following the pattern 'NAMES TELL A LOT'. Exploring the connected patterns helped for the detailed understanding of the pattern under consideration. It clearly indicates the pattern language is more powerful than considering individual pattern in isolation. A pattern language needs an organizing principle that binds together various patterns (Fincher & Windsor, 2000). During workshops, participants also suggested that organizing the patterns in different ways would be more useful (for example, human values involved, the nature of the design problem, and so on). The suggestion was consistent with the idea of usefulness of multiple organizing principles proposed in (Khambete, 2013). The patterns acted as a generic means of communication and the participants started using the pattern names to express their thought process effectively. This observation is consistent with (Thomas, Lee, & Danis, 2002) and (Khambete, 2013).

As a surprise approach, the facilitator selected the random pattern and asked to check the applicability in the given stage. One of the random patterns was 'EARLY AND PROGRESSIVE GRATIFICATION' and incidentally the team could use this pattern in one of the stages. This approach helped to come up with a completely random ideas.

Multidisciplinary Team Dynamics and Process

Most of the participants attended the initial preparatory workshops since they did not have any formal knowledge of pattern languages and service design concepts. The involved solutioning team had developed various interventions for organizational services in the past, but did not follow any formal design methods. Most of the participants in the team knew about the concept of software design patterns and were regularly using it. Lack of detailed understanding did not hamper the participant's enthusiasm from comfortably beginning to work with the service design and using design patterns. Participants found the use of the artefacts like personas, scenarios and customer journey maps advantageous and they kept referring it throughout the process.

Consistent with the findings in (Khambete, 2013), the participants selected patterns based on names, examples and summaries during the initial phase. Most of the time, the participants devoted time to discuss within the team, rather than going through the detailed documentation of

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pattern for clarification. These discussions helped to clarify the rationale behind the patterns, and to decide the suitability of a pattern in a specific problem and context. However, some participants opted to get clarity by reading the pattern details. Due to the multidisciplinary nature of the team, different perspectives about the same pattern emerged during the discussion and were helpful for a better understanding. Occasionally facilitators smoothly discouraged the prolonged discussions because the benefits started tapering off. Participants agreed that this constraint of a time bound discussion was very helpful. As suggested in (Khambete, 2013), the teams initially considered a small set of patterns for ease of progress. Though you start with a small set, chances of missing the relevant patterns are very less due to the inherent linking in a pattern language and thus get included as the design progresses.

As explained previously, the teams worked synchronously and asynchronously, as well as jointly and individually. Some of the participants joined midway of the design work and some were present partially. This freedom seems to have no significant impact on the progress.

Externalization due to the patterns along with the artefacts like persona posters, the post-it notes bearing the pattern names stuck to the customer journey maps, helped to record the thought processes during the design life cycle. Due to the nature of the team participation, there were discontinuities in the team interactions, but these externalized artefacts helped to overcome them. This is an important finding in line with (Khambete, et al., 2015), which highlights the need to combine externalization mechanisms with the pattern language to facilitate continuity in the team interaction.

The overall findings seem to have implications on the team composition in multidisciplinary setting and the required design process where the socio-technical environment can play a role as well to design organization services in specific or any other services.

Perceived Benefits

During this organizational service design project, we observed that the pattern language led to richer and innovative design solutions when used with a multidisciplinary team. 'If designers are able to understand and frame a problem in their own way, and follow a design approach aligned to their own goals and situations, then they can be more creative' (Dorst & Cross, 2001). The team created personas, scenarios and customer journey maps helped them to frame the problem. According to the participants, the

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pattern language guided and supported a structured and focused thought processes without hampering the creative ideation. The pattern language helped the team to make sure that all relevant aspects of a service encounter were addressed through the connected patterns.

Goel and Bhatta noted the power of analogies in design and role of patterns as 'productive units of analogical transfer' (Goel & Bhatta, 2004). We observed that pattern examples trigger the analogies, which led to a holistic understanding of the problems and its creative solution ideas. This case study helped to study the participation effect of service owners, developers and solution implementers on service design process and design outcomes. Participants' experiences highlighted issues of broader applicability such as cost versus benefit, impression of project strength, locus of control between organization, employee as referral and referee and assumptions about how changes are perceived and accepted in their organizational environment. Interestingly due to the organizational roles of participants involved, the acceptance of the design outcome was easy and the in-process solutions tried out during service design phase. The other visible benefits were, consideration of several other facts about design situations that may not have been aware of, different yet interesting approaches to the solution ideas, balanced articulation of needs, wants and preferences including conflicts in structural manner. This organizational service design project, also helped to increase the service design awareness in the organization in-line with the current design proliferation initiative.

Revisiting the Same Multidisciplinary Team

When we revisited this service design team after a gap of six months, following were the key observations in this process:

1. Framing any problem as service, not IT system.

In an organization, employee engagement programs are rarely considered as a service; employees are not considered as customers. This reimagining of the referral program showed a different perspective to the team and implementation of the same reflected the change in stats for employee engagement.

2. Need repetitive process for service design as demands are very quick.

In large organizations like these, the demands are quick and there is a need to show the change in stats of using this process. The team felt that implementation of the solution should go hand in hand with the process of service designing and agile process can be followed for designing also.

3. Method is still evolving.

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The use of random patterns technique gave many innovative solutions and made the team tickle their brain; which helped in a better solution and has widened the gauge of thinking about the problem statement. Many techniques like this can be incorporated in the service design process, which will enhance the power of the solution.

4. Need of Service Designers interventions

Even after preparatory sessions the need of designer persists, like in an instance during process, the team was stuck in decisions about refining the patterns after the first selection. In these kinds of scenarios, expertise about patterns comes into picture and the designer suggested discarding the pattern if in doubt stating: if the pattern were applicable then, it would come back in the picture through network of the patterns. Role of the timekeeper is important and relevant for a focused activity.

5. Pattern language imbibed in participants

In the interaction after a six months break, the team informed that they have imbibed patterns and the pattern language. They have practiced it at many other places of implementation and other projects. Visual examples and brief summary helped them remember it for a long term.

It helped develop organizational expertise and creativity, where the service design attitude, process and use of pattern language imbibed in the participants and they were able to practice it regularly.

Other Insights

As TAM3, the types of determinants of perceived usefulness applicable in service design, which have design characteristics are as follows (Venkatesh & Bala, 2008):

Job Relevance - The degree to which an individual believes that the target system is applicable to his or her job.

Output Quality - The degree to which an individual believes that the system performs his or her job tasks well.

Result Demonstrability - The degree to which an individual believes that the results of using a system are tangible, observable, and communicable.

To increase the adaptability of the incentive based employee referral for recruitment in a large IT Services organization, determinants of TAM3 were specifically addressed and ideas were generated to address them. To address the job relevance, ideas like - Result Demonstrability aspects supported through ideas like sharing stories on social media, closed organizational groups and have an ambassador to the group. It is also suggested to call the referee once the profile is received and call the referrer

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on the result. The status - event closed, started, in progress or will be delayed should be conveyed to both referrer and referee. Live chats, mails should have acknowledgement with the next response time with the name of the person who will contact the referrer or friend.

Conclusions and Directions for Future Work

During this case study, we observed that the past knowledge of the participatory design method along with the pattern language is an effective design tool for service design. It was also underscored that patterns and pattern languages can play a facilitating role in multidisciplinary teamwork. As highlighted in the previous sections, we discovered several theoretical and practical implications during this project. We present a few of them. It seems that working understanding of a pattern can be acquired through the pattern name, examples and short summary only. The linkages of patterns help in understanding individual patterns holistically. We uncovered the advantages of a multidisciplinary team where participants are users, owners, solution implementers of the service being designed (for example, bringing the perspectives from their own experiences, enriching each other's understanding). This observation is consistent with (Khambete, et al., 2015) where it was found that having in-depth knowledge of the pattern language at the beginning is not a prerequisite provided the team has easy access to information through 'pattern language experts' and the patterns repository. The detailed understanding of patterns can be acquired and enhanced through use. The effectiveness of sharable artefacts like persona, scenarios and customer journey maps built around patterns in knowledge transfer (KT) and ensuring continuity of thought process in face of a multidisciplinary distributed team constraints was a significant finding consistent with (Khambete, et al., 2015). The chosen participant for this case study underlined the implications mentioned in TAM3 (Venkatesh & Bala, 2008) and helped to come up with the design intervention to increase the designed service system adoption. The process followed in the study seems to be appropriate for the service designer community and these findings have significant implications in how to compose the team and practice the service design process.

The scope of the study was around one important organization service, that is, incentive based employee referral for recruitment in a large IT Services organization. Extending this study for additional organizational services and for other service domains would add to the knowledge when specific participants are involved in multidisciplinary service design. We

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believe ours was one of the initial studies of use of a pattern language along with the participatory multidisciplinary team of users, owners and solution implementers designing services for themselves.

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References

- Adler, P. S., & Kwon, S.-W. (2002). Social Capital: Prospects for a New Concept. *The Academy of Management Review*, 27(1), 17- 40.
- Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: towns, buildings, construction (Vol. 2)*. Oxford University Press.
- Athavankar, U., Khambete, P., Roy, D., Chaudhary, S., Kimbahune, S., Doke, P., & Devkar, S. (2014). Multidisciplinary Team Dynamics in Service Design-The Facilitating Role of Pattern Language. *India HCI 2014 Conference on Human Computer Interaction* (p. 16). ACM.
- Athvankar, U., Khambete, P., Doke, P., Kimbahune, S., Devkar, S., Roy, D., & Chaudhary, S. (2014). Exploring Cards for Patterns to Support Pattern Language Comprehension and Application in Service Design. *Proceedings of the India HCI 2014 Conference on Human Computer Interaction* (p. 114). Delhi: ACM.
- Campbell, A. (2011). Collaboration is misunderstood and overused. *Harvard Business Review online blog*. hbr. Retrieved from http://blogs.hbr.org/cs/2011/09/collaboration_is_misunderstood.html.
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 60–95.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten year update. *Journal of Management Information Systems*, 60-95.
- Dorst, K., & Cross, N. (2001). Creativity in the design process: co-evolution of problem-solution. *Design studies*, 425-437.
- Erickson, T. (2000). Lingua Francas for design: sacred places and pattern languages. *3rd conference on Designing interactive systems: processes, practices, methods, and techniques* (pp. 357-368). ACM.

Participatory Service Design for Reimagining Corporate Services: A Case Study

- Fincher, S., & Windsor, P. (2000). Why patterns are not enough: some suggestions concerning an organising principle for patterns of UI design. *CHI'2000 Workshop on Pattern Languages for Interaction Design: Building Momentum*.
- Fischer, G., & Shipman, F. (2011). Collaborative Design Rational and Social Creativity in Cultures of Participation. *Human Technology*.
- Giaccardi, E., & Fischer, G. (2008). Creativity and evolution: a metadesign perspective. *Digital Creativity*, 19-32.
- Goel, A. K., & Bhatta, S. R. (2004). Use of design patterns in analogy-based design. *Advanced Engineering Informatics*, 85-94.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Quarterly*, 82(2), 581-629.
- Halskov, K., & Hansen, N. B. (2015). The diversity of participatory design research practice at PDC 2002-2012. *International Journal of Human-Computer Studies*, 74,81-92.
- Kelly, K., & Schaefer, A. (2014). *Creating a Collaborative Organizational Culture*. Retrieved from <http://www.kenan-flagler.unc.edu/>: <http://www.kenan-flagler.unc.edu/~media/Files/documents/executive-development/unc-white-paper-creating-a-collaborative-organizational-culture.pdf>
- Khambete, P. (2013). *Designing desirable service experience: a pattern language framework for designing touch point ecosystems*. Indian Institute of Technology Bombay.
- Khambete, P., Athavankar, U., Doke, P., Shinde, R., Roy, D., Devkar, S., & Chaudhary, S. (2015). A Case Study in Participatory Service Design for Rural Healthcare System in India Using a Pattern Language. *ICoRD'15-Research into Design Across Boundaries Volume 1* (pp. 3-13). Springer India.
- Kimbell, L. (2011). Designing for service as one way of designing services. *International Journal of Design*, 5.
- Koys, D. J. (2001). The effects of employee satisfaction, organizational citizenship behavior, and turnover on organizational effectiveness: A unit-level, longitudinal study. *Personnel psychology*, 54(1), 101-114.
- Maher, M. L., Poon, J., & Boulanger, S. (1996). Formalising design exploration as co-evolution. In *Advances in formal design methods for CAD*. Springer US, 3-30.
- Mamykina, L., Candy, L., & Edmonds, E. (2002, October). Collaborative creativity. *Communications of the ACM*, 10, pp. 96-99.

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- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of management*, 23(3), 513-563.
- Sangiorgi, D. (2009). Building up a framework for Service Design research. *8th European Academy of Design conference*, (pp. 415-420).
- Thomas, J. C., Lee, A., & Danis, C. (2002, October). Enhancing creative design via software tools. *Communications of the ACM*, pp. 112-115.
- Venkatesh, V., & Bala, H. (2008, May). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences*, pp. 273-315.
- Weiss, J., & Hughes, J. (2005, March). Want collaboration. *Harvard Business Review*, pp. 93-101.
- Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, 85-102.

Appendix

3

Exploring
Distributed
Cognition as
a Conceptual
Framework for
Service Design

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India 2017

Exploring Distributed Cognition as a Conceptual Framework for Service Design

Ravi Mahamuni, Pramod Khambete and Ravi Mokashi Punekar

Abstract Service Designers envision, systematically plan and choreograph unique solutions. Design is a creative activity of problem solving to create desirable solutions. Service design is the natural extension of the design activity where multidisciplinary collaboration extends over a period. Hutchins developed a theory of distributed cognition, which redefined 'information' as the propagation of representational states of mediating structures of any complex system. This research paper presents observations from the organizational recruitment service case study, which displays the use of distributed cognition concepts in the service design process for a multidisciplinary team collaboration and recognizes the influence of non-human agents on service. During the case study, working in a team on the same artefacts, the artefacts played a role in supporting each other's thought process through a mental structure of problems and solutions. It has implications on the design process and the artefacts generated.

Keywords Service design · Distributed cognition · Participatory design · Multidisciplinary team · Organizational service

1 Introduction

Services evolve over time through a sequence of events and steps that produce value for the customer [1]. Design of these services is a customer centric activity of planning and organizing people, infrastructure and communication as a holistic

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socio-technical system [2]. A service designer must take into account the needs of the entire world, including the environment [3]. Similar to design, Service Design is a creative problem solving activity, which involves thinking with your body and externalization of thinking through in-process artefacts. Unlike product design, service design incorporates temporal relationships making it complex. Services are multidimensional as they involve socio-technical and user centric aspects. Hence, people from various domains need to contribute during service design. The quality of the outcomes of service design process can be accomplished only through multidisciplinary participation and effective collaboration [4]. Multidisciplinary participation also helps to gain deep insights of customer expectations and to add innovativeness in the service being designed [5]. In order to improve design thinking, there is a need to involve professionals with diverse experiences from relevant disciplines in the design teams, and effectively integrate their knowledge in the outcomes. We explore in this paper how Service design activities in a multidisciplinary setting can be carried out effectively and productively if informed by ideas from the distributed cognition (DC) theory.

Hutchins [6] developed a theory of DC, which offered a new perspective towards cognition. Challenging the idea that cognition is confined to an individual's head, he proposed that it is a group process, and must be viewed as the property of a socio-technical system. Externalizations are assigned a crucial role in this perspective. The complementarity of DC and service design, with regard to the external representations was noted [7]. Techniques used in making external representations for service design are related to the cognitive processes. They help in articulating insights, learning, communicating and collaborating. Further, they make intangible aspects of services accessible, storable and sharable [7]. Fischer proposed a conceptual framework for design based on DC, but its focus was on people with cognitive disabilities [8].

This research paper explores and elaborates the idea of the congruence of DC and Multidisciplinary Service Design using an organizational recruitment service design case study. We propose that the application of DC concepts can be beneficial in informing multidisciplinary, collaborative service design process, so that the efficiency and effectiveness can be enhanced.

2 Related Work

Design is making things better for people [4], and design outcomes influence people's lives. Designers' decisions are based on the synthesis of insight, intuition, and reason. Aspects of 'designerly' thoughts are that they are holistic, provable and based on envisioned future possibilities [9]. Apart from the traditional techniques, recent approaches such as Design thinking are used as a driver for innovation and to develop superior solutions to problems [10]. Evolving design discipline like Service

design requires a systematic approach for applying design methodology and principles [11]. Service design discipline is a fusion of design thinking and new methods aiming at innovation and improving quality of services delivered to its customers. Five foundational principles for service design are user-centeredness, co-creativity, sequencing, evidencing, and holistic perspective [12]. As part of co-creativity and evidencing, external representations corresponding to mental representations of the designers provide a structure that can serve as a shareable object of thought [13].

Further sub-sections, elaborate on the linkages among service design principles, DC concepts and Human centered design.

2.1 *Distributed Cognition (DC)*

Cognition is the mental process of knowing through perception, reasoning, or intuition [14]; and it is distributed in time, location, and across human and non-human agents [15]. DC theory identifies a set of core principles like: as a part of cognition process human beings establish and coordinate different types of structure in their environment, it takes effort to maintain coordination between them, and so on. Humans use their surroundings to enhance their memory [15]. This theory took a culturally constituted functional group as the unit of analysis rather than an individual mind and redefined 'information' as the propagation of visible states of mediating structures of any complex system. These structures include internal as well as external knowledge representations like skills, tools, memory and culture [6]. Hutchins [16] argued that DC concepts help in comprehending aspects of structured experience and individual learning. DC helps understanding how people think and act through continual interaction between brain, body and contextual situations [15]. These interactions happen mainly through external representations supporting more intricate, holistic and involved 'thinking'. The key components of the DC theory are the 'cognitive system'; 'communicative pathways', and 'propagation of representational states' [17, 18].

In contrast with traditional cognitive science, Hutchins [18, 19] believed that human beings create their cognitive powers in parts by creating the environments to exercise those powers. In this process, cultural practices play a key role. Clark [20] advocated an active externalism, based on the active role of the environment in driving cognitive processes. In a similar vein, Latour [21] proposed that objects, which are actors in social processes, assume the role of intermediaries and participants in the action. Along with this, these objects also provide continuity during the participatory design process and have appropriate form and content. We noted the resemblance of these ideas to the role of externalization in the distributed cognitive processes.

2.2 *Human-Centeredness and Co-design of Services*

As stated above, one of the most desired characteristics of service is being human-centered to achieve customer satisfaction and in this endeavor, it requires effective collaboration within a multidisciplinary team participating in design [11]. As co-design involves collaborative decision-making and combining creativity of multiple people, it helps collectively create more number of innovative concepts and ideas than while working on their own [22]. Participants in co-design can be users, designers, professionals and domain experts who together create value for customers. In order to augment the process, a common language or vocabulary should be available to exchange the ideas effectively within the team. Co-design supports effective engagement of the participants in a process of creative conceptualization, implementation and evaluation [4] where involved immersive activities are the main drivers for participation [23].

2.3 *Human-Centered Design and Distributed Cognition*

Service design draws on several ideas from another human centered design field, Human-computer interaction (HCI). It was advocated that HCI design should be derived from an understanding of service interaction since the information systems are often used to deliver or support some kind of service [24]. Service design shares the HCI field's commitment to working with and for people in the development of useful services and can borrow the user-centered mindset and techniques from HCI Design domain [25]. HCI design makes use of DC analysis such as, revealing the constraints that are implied by the representational media or other factors, understand individual as well as group dynamics [15]. Hence, use of DC concepts, which are found useful in HCI, can be extended to service design.

2.4 *Design Theories and Externalization*

There are many theories that explain the design process, but they mainly focus on creativity, teamwork, management, social aspects, aesthetic or ethical aspects, analytical or visual thinking [26], without significant consideration of the role of externalization. Externalization facilitates the computation of more explicit encoding of information; enables the construction of complex structure; and helps the coordination of thought. These functions allow people to think more powerfully and creatively with external representations [12].

Design process is characterized as a thinking and social activity comprised of the transformation of abstract to concrete; that is from the vision in the designer's head, through an increasingly detailed operative image, to a complete specification and a

final product [26]. This happens through reflection-in-action and reflection-on-action. In order to cope with a complex design process, a designer needs to externalize the actual design thinking through representations: sketches, drafts, models, and the like. With the external representations, the designer carries out a dialogue about the design situation and solution ideas. There is an ongoing conversation between the designer and the situation and the representations like sketches, drawings, and so on that can be understood as tools for thinking and as mediators in the dialectic relationship between the vision, the operative image, and the situation [27]. These externalizations help designers to experiment and evaluate their ideas early and cheaply.

A key construct from design theory is the Conceptual Model, which is a high-level description of how a system is organized and operated [28]. A Conceptual Model, also called as mental model is a structure, which exists in people's minds [29]. Design patterns is another example of the externalized mental model [18]. People create mental models of themselves, others, the environment, and the things with which they interact. These mental models come into existence through experience, training, and instruction; and serve to achieve understanding of the world. The designer's mental model as the designer's conception of the look, feel, and operation of a product [30] becomes the shared system image in participatory or co design. Externalization helps to evolve this shared system image [31]. Representing work during system design enable coordination and control of complex, distributed activities. In addition, adapting appropriate representations in the design process could help in bringing together disparate knowledge [32].

All these theories suggest that the externalizing various structures in the design process is recommended and its importance is well known [33]. In the same vein, externalization is explained through the idea of boundary objects. A boundary object is defined as, "an artifact or a concept with enough structure to support activities within separate social worlds, and enough elasticity to cut across multiple social worlds" [34]. Boundary objects bridge the functional knowledge and stakeholder power gaps and have the capability to promote shared representation, transform design knowledge, mobilize for action, and legitimize design knowledge [35].

3 Motivation and Objective of Research

The examples given by Hutchins [6, 15, 16, 18], pertain to relatively short duration activities. For instance, in the example of ship navigation the activities last for a relatively short duration. However, service design comprises a set of interconnected activities that occur over a longer duration and call for tailored DC concepts to enrich its process.

As indicated in previous sections, external knowledge is an essential part of collaboration. Though lot of research has been done in this field, it seems, building a knowledge base has not been studied from a DC perspective. As we understand, DC can be a fruitful framework for understanding how people in a collaborative

situation think and act; not because of brain activity alone, but also because of the constant interplay between brains, bodies and situations [26]. External representations play a special role in this interplay, and allow holistic and complex thinking [26]. It appeared looking at DC theories, collaboration and multidisciplinary concepts that tailored theoretical concepts coming from them might be useful in service design, which is a collaborative endeavor.

4 Case Study Observations

While we were evaluating the DC and its applicability in the service design context, side by side the service design project was initiated to reimagine the incentive based employee referral for recruitment in our organization (Called Bring You Buddy—BYB). The aim of this service system was to improve the perception of the service among employees, and facilitate a desirable experience of referral so that the business objective of high-quality recruitment at scale could be met [36]. Instead of the then prevailing almost exclusive focus on the Intranet Web site for BYB, we framed it as ‘service’ to the employees. We took this opportunity to observe the real life service design process and look for the patterns of DC concepts getting instantiated during the process (Fig. 1). Participants of the multidisciplinary service design team had different areas of expertise with diverse set of knowledge. It was comprised of employees who are the users of the service, service owners, developers of the technology platform used for recruitment and its solution implementers [36]. This service design project was carried out as nine full day workshops over a period of four months, and certain allied activities like data collection done asynchronously. We were looking for interplay and use of externalization mechanism in multidisciplinary team setting for creative activity of service design.

Following are our observations during this service design case study:

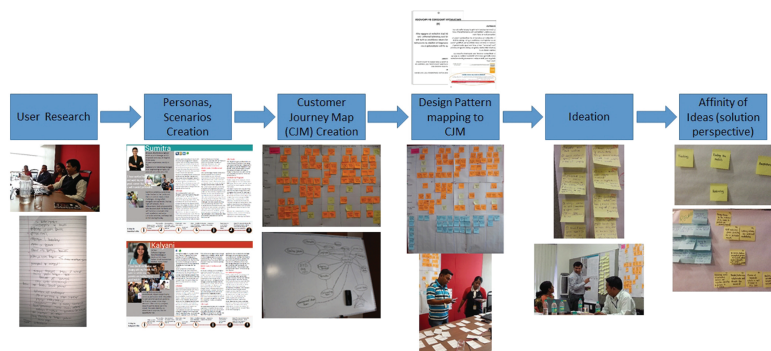


Fig. 1 Externalized representation associated with stages in the service design case study

4.1 Domain Familiarization and Data Collection as Part of User Research

Initially, two external experts and their research associates from a premier design school were sensitized about the organizational services, specifically the recruitment through employee referrals and its challenges. The two of them acted as observers and facilitators. From the DC perspective, the mental structures were externalized using white boards and through presentations to communicate and form a common mental model about the said organizational service across the team. Subsequently, user research activity was planned to discover the service experience goals, contexts and current issues. Semi structured interviews were conducted in various Indian cities—Pune, Mumbai, Chennai and Hyderabad by four different teams. Each team covered average 10 employees per location. These interviews were audio recorded and photographs were taken for future use. During the semi-structured interviews, all interviewers formed their own mental model about the interviewee.

4.2 Creating Personas and Identifying Key Scenarios

The use of personas in the design life cycle is well known [37]. The team developed personas and key scenarios from the user research. As part of the user research, the team observed the users and came out with an understanding about them and their relationships. Together all this knowledge transformed as a structure in people minds, which subsequently reflected into personas as external representations. Due to the participation of the multidisciplinary team during the user research, multiple mental structures (reflecting different understanding by each design team member) were formed about the users of service. Together they arrived at a shared mental structure that is, a common understanding through synthesis. We also observed that the structures were continuously evolving and new structures were formed through an iterative process of discussions and progressive understanding. This resulted into a common understanding that was translated into two personas, which were used afterwards during the design process. From the DC perspective, the team had unconsciously created internal structures, and associated external structures [38] such as field notes during and after the user research. The team arrived at the personas and key scenarios through discussions and use of white boards.

4.3 Creating Customer Journey Map (CJM)

The Customer Journey Map (CJM) is a chart, which describes the orchestrated customer journey by representing the different stages in a given scenario that

characterizes the individual’s interaction with the service [39]. The major inputs while creating the CJM are the personas, scenarios built during the previous stages and the mental structures of all the team members.

The details of the setting in which the CJM creation took place are worth noting. The posters of the identified personas were visibly displayed at all the time at the workshop/design location while creating the CJM. The agreed upon template of CJM was also displayed on the wall and was made interactive through use of post-its. The CJM evolved through the iterative process where externalized cognitive artifacts such as personas were constantly referred along with the notes taken during the user research and previous workshops. We also observed that arriving at the decision of what knowledge to externalize in the CJM happened through several iterative group discussions and progressive synthesis to reach a common understanding. The externalization of mental structures happened unconsciously, were visible through small activities such as annotating which post-its were interconnected and putting post-it indicating ‘intentionally kept blank’ to avoid any confusion during future stages of service design (Fig. 2).

It took several full day workshops to arrive at the holistic and complete CJM. Every stage of CJM was captured through photos and in-process artefacts as a mechanism to maintain continuity across multiple workshops. These photos and

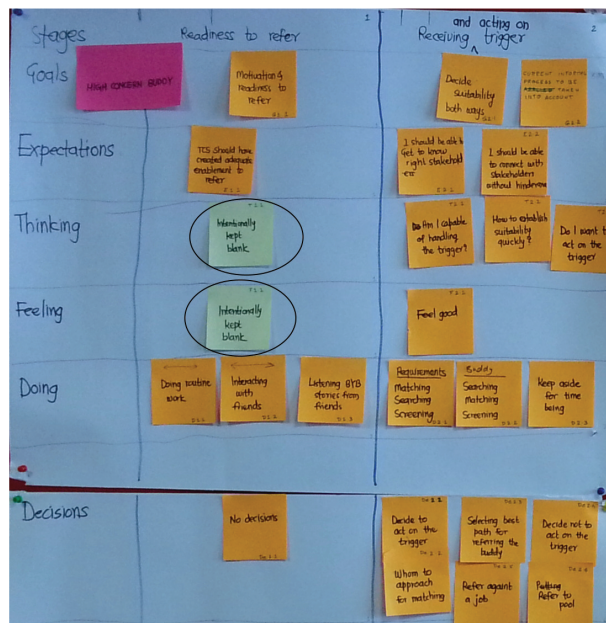


Fig. 2 Use of ‘intentionally kept blank’

artefacts carried the mental structure across the workshops and the team could start immediately during next workshop only with brief recap. This helped participants to readily recollect their mental structures, and build on top of them. These observations are not only consistent with the concepts of DC but also strengthen the case of their relevance even when the mental structures need to be carried forward intermittently over a longer period.

4.4 Mapping of Design Patterns to Customer Journey Map

From the DC perspective, pattern language is the previous knowledge and mental structures about solving certain problems along with its creative solutions, which are externalized and made available for future use (Fig. 3). During this case study, the design patterns were shared as physical cards with the team. In addition, the full pattern language was also available as a navigable MS Excel workbook. Thus, two representations of the same externalized knowledge were provided. They were marked as primary and secondary patterns for better understanding [40]. The team associated the design patterns to different stages of the CJM, that is, arrived at a

©

TIMELY REDRESS OF GRIEVANCE (11)

SUMMARY:

Customer grievances could be real or perceived. Use TPES and technology effectively to capture grievances, including unreported ones, and address them quickly. This pattern is applicable to self-service Touch Points as well, where the TPES has a greater role to play.

RECOMMENDED PATTERNS:

SHORT FEEDBACK AFTER ENCOUNTER (21), ENCOUNTER TRIGGERED BY PROVIDER (9), SATISFYING ENCOUNTER CONDUCTED REMOTELY (173), LAPSE IS ADMITTED (12), UNDEMANDING ENCOUNTERS INITIATED BY PROVIDER (20)

DESIRABLE PATTERNS:

PROGRESS INDICATION (4), CUSTOMER CAN TRACK PROGRESS (5), CORRECT EXPECTATIONS ARE SET (14), EXTRA (54)

*TPES: Touch Point Ecosystem

EXAMPLES:

- In good restaurants, the waiter / supervisor would generally ask the customers if the meal is meeting their expectation. If a customer complains that the dish is not prepared according to his instructions, the would offer to replace it without arguments.
- Goods return policies that favor customer's interest over the providers' (including online shopping portals).

Returns, refunds and replacements

This information applies to devices and accessories purchased in the United States.

All purchases from November 26, 2013 - December 26, 2013 may be returned through January 13, 2014.

Google Play aims to deliver you cutting edge Android- and Chrome- powered devices and accessories that you'll love. If you aren't satisfied with your purchase, please review the information below to find out how to get the item you want or a refund for your purchase.

Request a return & refund

11

Fig. 3 Sample design pattern card

common structure through verbal exchange with frequent reference to the pattern cards and the workbook. The process led to a rich synthesis of various individual mental structures about the relevance of specific design patterns in the context of the CJM. It was also observed that the mental structure got refined throughout the process and participants sometimes removed the already selected design patterns, added new ones and recorded affinities among the patterns.

4.5 Ideation and Affinity of Generated Ideas

After refined CJM and design pattern association, solution ideas were generated and noted for each stage of CJM and sometimes across the stages. These design patterns triggered the different mental models leading to the discussion for arriving at a common understanding. Single design pattern triggered one or more solution ideas. This ideation process was iterative and the ideas were evolved over a period. Ideation process generated many ideas across every stage. It is very cumbersome to detail out every idea. So it was decided to cluster together the ideas from implementation perspective to make it manageable. Post-its were used extensively during this phase and team members discussed and arrived at the different idea groups and assigned the ideas to that group. Idea groups refined during the entire stage.

4.6 Insights Consolidation and Sharing

All the artefacts created through previous phases along with the individual's understanding helped in consolidating all insights. Consolidated insights, that is, some form of service specification handed over to the solutioning team for implementation. From the DC perspective, the role of specifications is to externalize the mental future state and visualize the future structure. As design is all about future [29], service specifications provided the path from moving the current state to the future state and specifying which mental structure need to accomplish.

4.7 Revisiting the Team to Understand Longitudinal Effect

We revisited this service design team after a gap of six months to understand the participants' experiences after the service design project. During this visit, we refreshed their memory by narrating the overall process along with the in-process artefacts and the actual photographs. These external structures helped them trigger their own internalized mental structures. During the participants' semi-structured interviews, they reflected on their involvement and feelings about the project.

A significant finding was that the participants had successfully internalized concepts and the knowledge gained.

They have been creatively applying and transferring to others the newly acquired cognitive structures (“When I have to convince someone about a design concept, I refer to my notes from the workshop”, “Sometimes, when I get a design idea, I look back at what we did and validate it”). It seems that the experience and the structured knowledge helped develop organizational expertise and creativity, where the service design attitude, process and use of pattern language were imbibed in the participants and they were able to practice it regularly. Further, the participants appeared to successfully expanding the boundaries of the distributed cognitive space.

5 Proposed Actionable Recommendations

As explained above, we observed multiple DC concepts in use during this case study and hence we believe that it works and there is a possibility of generalizing it. We suggest doing these activities formally; will improve the overall effectiveness of the service design process. Following are some of the proposed actionable recommendations, which need validation through future investigation. The recommendations proposed seem obvious however reflecting upon the service design process at present, they add value for long temporal service design process spanning across multiple weeks.

1. Reframe the problem statement as a catchy one-liner like “How to an enable organization to act like a magnet.” Always displaying it so that all the service design effort is driven towards it.
2. Annotations like date, place and purpose provide the backward traceability to the previously created representations and help refresh mental structures that would degrade with memory.
3. Use of design patterns to learn from the past as well as from other domains.
4. Capture moments like group interactions from various vantage points through photos and annotate it to enhance the overall recall.
5. Focus on synthesis of all information instead of just consolidating would help in arriving at common mental models.
6. Externalize the explicable knowledge during every phase will help to recollect the designer’s mental structures during next phases of service design life cycle.
7. Capture the in-process artefacts like sketches evolution along with final artifacts during the service design process to record the mental structure progression.
8. Techniques like replaying of the actions done during service design process would help reflect and refine the artefacts.
9. Maintain the continuity and constant referral of mental structures by displaying all relevant artifacts at the design location.
10. Have diversity of mental models to help in arriving at a holistic design. Multidisciplinary team can provide the diversity of mental models.

6 Conclusion and Future Direction

During this organizational service design case study, we studied how multidisciplinary teams used the previously externalized cognitive structures and in-process artefacts to articulate thought processes, communicate insights, maintain empathy about users, collaborate within the team, and transfer knowledge and learning. In this process, we noticed that the teams iteratively created and worked on the same artefacts representing the shared cognitive structures. These artefacts played a critical role in supporting each other's thought process by transferring and refining commonly held mental structure of problems and solutions, in turn converting them into sharable artefacts. Typically, the nature and representation mapped to the internal structures (for example, in case of personas, the evocative photographs, captions and the "story of their life" mapped to the complex understanding of the behaviors and circumstances; the customer journey map mapped to the broad temporal progression and important aspects at each stage such as emotions and thinking). We observed that team members developed internal mental structures as part of the various phases as well as due to past experiences and knowledge, which got transferred as personas, scenarios, CJM and solution ideas. It was also evident during multiple phases of service design process that the structures were continuously changed and new structures were formed through an iterative process leading to one common understanding wherever required. These synthesized common understandings were then used during the further design process. Multiple in-process artefacts were created along with the final artifacts. Process of harmonizing all these artifacts using DC concepts need further investigation.

We observed the strong evidence of the instantiation of DC concepts during service design process, which is a long duration, intermittent activity. As previously stated, in contrast with short duration focus of Hutchin's and other studies, the service design is a long duration activity and would need an adaption of the DC perspective. We have prima facie support to the relevance of the DC concepts in such a situation as well, which is a new finding. Service design process must recognize the need to deal with several of mental models of participants and incorporate elements to externalize it appropriately after synthesis and apply it effectively as the design evolves. The multidisciplinary team was exhibiting the implicit use of DC concepts during the service design process and would need mechanisms to externalize the internal thought process that is, mental models, harmonizing them and maintaining the continuity across them. Our study has pointed to the likely characteristics such externalizations should have to serve as effective vehicles to support distributed cognition. Iterative development, synthesis of multiple individual mental structures and a form that can be "intuitively" comprehended regardless of the domain of expertise (for example, Persona, Scenarios, CJM and Design Patterns in our case) seem to be the attributes.

This theoretical study and the observations from the study has produced useful practical insights. Even, though they are based on a single case, they are relevant as a new perspective and approach, which can be judiciously applied by practitioners.

We are conscious of the limitations of an exploratory, albeit serious attempt, this study represents. Further investigation to validate and enrich the early insights are needed. This would help to generate knowledge that can make service design process more efficient, rich and handle challenges of multidisciplinary settings. Clearly, further investigation and validation in various multidisciplinary settings and service domains is called for. A study in which several kinds of knowledge artifacts from different disciplines (for example, service design patterns and software design patterns), domain specific standard representations (for example, flow charts) and structures created during the design process get integrated can be expected to throw rich insights. Another interesting area relevant for theory as well as practice is the observed phenomenon of participants internalizing and propagating the newly acquired cognitive structures (see Sect. 4.7) over a period as well as in new situations. How this happens, what supporting processes are needed and what kind of externalizations can help can be an interesting direction to study further. In spite of its limitations, we hope that this study will serve as the starting point of discussion around distributed cognition concepts and its implication in the service design process.

References

1. Bitner, M.J., Ostrom, A.L., Morgan, F.N.: Service blueprinting: a practical technique for service innovation. *Calif. Manag. Rev.* **50**(3), 66 (2008)
2. Fensel, D., Facca, F.M., Simperl, E., Toma, I.: *Semantic web services*. Springer Science & Business Media (2011)
3. Design Council, UK. http://www.mech.hku.hk/bse/interdisciplinary/what_is_design.pdf. Accessed 20 Aug 2015
4. Mamykina, L., Candy, L., Edmonds, E.: Collaborative creativity. *Commun. ACM* **45**(10), 96–99 (2002)
5. Kimbell, L.: Designing for service as one way of designing services. *Int. J. Des.* **5**(2) (2011)
6. Hutchins, E.: *Cognition in the Wild*. MIT press (1995)
7. Blomkvist, J., Segelström, F.: Benefits of external representations in service design: a distributed cognition perspective. *Des. J.* **17**(3), 331–346 (2014)
8. Fischer, G.: Distributed cognition: a conceptual framework for design-for-all. In: *Proceedings of HCI International*, vol. 4, pp. 78–82. Lawrence Erlbaum Associates, Mahwah, NJ and Crete, Greece (2003)
9. Miller, W.: *Definition of design*. Trintab, Buckminster Fuller Institute (2005)
10. Holmlid, S., Evenson, S.: Bringing service design to service sciences, management and engineering. In: *Service Science, Management and Engineering Education for the 21st Century*, pp. 341–345. Springer US (2008)
11. Stickdorn, M.: 5 Principles of service design thinking. *This is Service Design Thinking*, pp. 34–45 (2000)
12. Taura, T., Nagai, Y.: A definition of design and its creative features. In: *Proceedings of International Association of Societies of Design Research* (2009)
13. Kirsh, D.: Thinking with external representations. *AI Soc.* **25**(4), 441–454 (2010)
14. Neisser, U.: *Cognitive psychology*. Prentice-Hall, Englewood Cliffs, NJ (1967)

15. Hollan, J., Hutchins, E., Kirsh, D.: Distributed cognition: toward a new foundation for human-computer interaction research. *ACM Trans. Comput. Human Interact. (TOCHI)* **7**(2), 174–196 (2000)
16. Hutchins, E.: How a cockpit remembers its speeds. *Cogn. Sci.* **19**(3) (1995)
17. Nilsson, S.: Augmentation in the wild: user centered development and evaluation of augmented reality applications (2010)
18. Rogers, Y.: A brief introduction to distributed cognition (1997)
19. Hutchins, E.: Distributed cognition. *International Encyclopedia of the Social and Behavioral Sciences*. Elsevier Science (2000)
20. Clark, A., David C.: The extended mind. *Analysis* **58**(1) (1998)
21. Latour, B.: Reassembling the social-an introduction to actor-network-theory. *Reassembling the Social-An Introduction to Actor-Network-Theory*, by Bruno Latour, pp. 316 (2005)
22. Mitchell, V., Ross, T., May, A., Sims, R., Parker, C.: Empirical investigation of the impact of using co-design methods when generating proposals for sustainable travel solutions. *CoDesign*, pp. 1–16 (2015)
23. Simonsen, J., Robertson, T. (eds.): *Routledge international handbook of participatory design*. Routledge (2012)
24. Sarmiento, A.: *Issues of human computer interaction*. IGI Global (2005)
25. Idoughi, D., Seffah, A., Kolski, C.: Adding user experience into the interactive service design loop: a persona-based approach. *Behav. Inf. Technol.* **31**(3), 287–303 (2012)
26. Löwgren, J., Stolterman, E.: *Thoughtful Interaction Design: A Design Perspective on Information Technology*. MIT Press (2004)
27. Schön, D.A.: *The Reflective Practitioner: How Professionals Think in Action* (vol. 5126). Basic books (1983)
28. Johnson, J., Henderson, A.: Conceptual models: begin by designing what to design. *Interactions* **9**(1), 25–32 (2002)
29. Brown, T.: *Change by design* (2009)
30. Norman, D.A.: *The Design of Everyday Things: Revised and Expanded Edition*. Basic books (2013)
31. Zhang, J., Norman, D.A.: Representations in distributed cognitive tasks. *Cognitive science* **18**(1), 87–122 (1994)
32. Suchman, L.: Making work visible. *Commun. ACM* **38**(9), 56–64 (1995)
33. Blomkvist, J., Segelström, F.: External representations in service design: a distributed cognition perspective. In: *10th European Academy of Design Conference*, vol. 10 (2013)
34. Star, S.L., Griesemer, J.R.: Institutional ecology, translations' and boundary objects: amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Soc. Stud. Sci.* **19**(3), 387–420 (1989)
35. Bergman, M., Lyytinen, K., Mark, G.: Boundary objects in design: An ecological view of design artifacts. *J. Assoc. Inf. Syst.* **8**(11), 546 (2007)
36. Mahamuni, R., Sharma, S., Khambete, P., Mokashi-Punekar, R.: Reflecting human values in service design. In: *Advances in The Human Side of Service Engineering*, pp. 335–345 (2017)
37. Pruitt, J., Adlin, T.: *The persona lifecycle: keeping people in mind throughout product design*. Morgan Kaufmann (2010)
38. Hutchins, E.: Material anchors for conceptual blends. *J. Pragmat.* **37**(10), 1555–1577 (2005)
39. Service Design Tools. <http://www.servicedesigntools.org/tools/8>. Accessed 10 Feb 2016
40. Khambete, P.: *Designing Desirable Service Experience: A Pattern Language Framework for Designing Touch Point Ecosystems*. Indian Institute of Technology Bombay (2013)

Appendix 4

Service Design
for Behavioural
Change
- Current
State of the
Discipline and
Practice in
India

ServDes 18,
Milano, Italy
2018



ServDes2018 - Service Design Proof of Concept
Politecnico di Milano
18th-19th-20th, June 2018

Service design for behavioural change - current state of the discipline and practice in India

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Abstract

We investigated the current picture of appreciation, state of relevant knowledge and skills, and practice among the Indian design professionals regarding service design and design for behaviour change. Inter alia, the current scenario regarding the embeddedness and maturity path of service design in academic institutes and industry were studied. Indian society and businesses are facing challenges that are wicked, deep and complex due to the diversity of social, cultural, and economic conditions. They could benefit from a synthesis of service design and design for behavioural change. This study is exploratory in nature. However, it is a significant initial step to emphasize the need of and gaps in the aspects pertaining to effective service design for behavioural change practice in India and suggests indicative interventions. With these interventions, Indian professionals could achieve maturity and be in a position to address the wicked problem India faces.

KEYWORDS: service design, design for behaviour change, design in India, design practitioners in India, design education in India, wicked problem

Introduction

Design touches all spheres of human experience (Buchanan, 1992). With increasing technological complexity and business environments, living up to experiential aspirations of customers is more demanding (Kolko, 2015). Design Thinking (Brown, 2009) (Martin, 2009), or Designerly Thinking (Hass & Laakso, 2011) comprising a set of methods, mindsets and practices can address the challenges through human-centric, integrative, holistic interventions that balance the needs of several stakeholders. This mode is critical to address the complex and 'wicked' problems faced by society.

Designed products and services shape culture, behaviours, attitudes, environments, and even values and priorities, as they inter alia "design", that is facilitate or hinder certain activities and actions (Kolko, 2012, p. 18) (Stanton & Baber, 1998). It is not feasible though to

segregate “behaviour” as a discrete component, as a user’s experience during the life cycle engagement with products and services and behaviours co-evolve (Kolko, 2010).

The Service Design discipline has matured now and attained a distinct identity. An emerging discipline is Design for Behaviour Change, which aims at influencing without coercion - the behaviours of individuals and groups for a better personal life and the world. It draws on fields like Psychology, Sociology, and Behavioural Economics among others. Governments, social organisations and businesses are leveraging its potential. A significant congruence in these two disciplines rests on the commonality in attention to long temporality of design interventions, offering opportunities of synthesis to leverage their synergy.

Services contribute to over 60% of India’s Gross Domestic Product (Reserve Bank of India, 2017). India also faces a plethora of developmental challenges. At the same time, the stable economy, enabling technology infrastructure and supportive government policies offer a great opportunity to enhance the pace of the development agenda. Therefore, the Indian society and businesses could benefit from a synthesis of service design and design for behavioural change. The thought motivated us to undertake the current exploratory study.

Design for Behaviour Change and Service Design: Alignment and Differences

Service Design

Service Design encompasses designing interactions, experiences, and relationships (Meroni & Sangiorgi, 2011). Well-designed, coherent Touch Points¹ and Touch Point Ecosystems, supporting backend systems, processes, and policies create service experiences. The users and a harmonised Touch Point Ecosystem interact to fulfil the users’ utilitarian and experiential goals over the span of service relationship through several service encounters. The temporal, cumulative build-up of experience was framed as momentary (“An Experience”), (Forlizzi & Battarbee, 2004), episodic and cumulative (Roto, Law, Vermeeren, & Hoonhout, 2011; Karapanos, John Zimmerman, Forlizzi, & Martens, 2009). The cumulative experience that emerges through sense making, interpretation, reflection, and appropriation influences the users’ behaviours and attitudes (McCarthy & White, 2004). The design of service environments, “Servicescapes” (Bitner, 1992) also affects the experiential outcomes. To conclude, Service design is user-centric, adopts micro as well as a holistic perspective, and is concerned with the coherence of experience in the user-service provider interactions in both short and long temporal relationships span.

Service providers co-opt users as collaborators to co-create value (Prahalad & Ramaswamy, 2004). The user’s motivations and behavioural dispositions are at once inputs to and outcomes of the value creation process. Services as ‘action platforms’ (Manzini, 2011) support or impede certain behaviours, but must do so without compromising the user’s freedom. Mindful Service Design therefore empowers the users and facilitates co-creation of outcomes desirable to them. Service Design in this perspective becomes an approach to evolve new methods and processes to align to the value expectations and roles of stakeholders (Yu & Sangiorgi, 2014).

¹ “Touch Points are the entities with which a customer interacts to commence or progress with a service encounter. They can be human (for example, a health worker), or non-human (for example, a portal). A Touch Point Ecosystem is a network of Touch Points that operates coherently to provide desirable service experience”.

Design for Behaviour Change

The need to influence and change a user's behaviour or that of the society to meet social challenges is now well-recognised. Behavioural change interventions occur at various levels – products, services, and moving up to public policy. An illustrative list of theories and approaches that have been used to guide the interventions is:

- **Disciplinary orientation: Psychology**
Learning, knowledge absorption, processing and retention; relations between attitudes, behavioural intentions and behaviours; behavioural changes over time and the attributes of the changed states (Learning Theories (Simandan, 2013), Theory of Planned Behaviour (Ajzen, 1991), Theories of Reasoned Action (Madden, Ellen, & Ajzen, 1992), Social Cognitive Theory (Bandura, 1986), (Prochaska & Velicer, 1997))
- **Disciplinary orientation: Psychology or Persuasive design using technology**
Role of Motivation, Ability, and Triggers in shaping behaviours, types of behaviour targets and appropriate interventions (Fogg B. J., 2009), (Fogg & Hreha, 2010)
- **Disciplinary orientation: Sociology**
The role of society and social processes in influencing behaviours and behaviour change; concerned with these in relation to individuals and groups (Granovetter, 1978), (Rogers, 2003)
- **Disciplinary orientation: Cognitive Psychology**
Role of beliefs, practices, norms, knowledge, and other such factors, along with their inter-relations in influencing behaviours. (Rosenstock, 1974), (Reckwitz, 2002)
- **Disciplinary orientation: Behavioural Economics**
Nudge (Leonard, 2008), Choice Architecture (Thaler & Sunstein, 2008), System 1 and System 2 thinking (Kahneman, 2011):
- **Disciplinary orientation: Multidisciplinary**
Behaviour influence and change frameworks that synthesise several theories to guide micro and macro design interventions (“4 E’s” model (HM GOVERNMENT, 2005), (DEFRA, 2008) Behaviour Change Wheel (Michie, Stralen, & West, 2011)), MINDSPACE (Dolan, Hallsworth, Halpern, King, & Vlaev, 2010), C-R-E-A-T-E Action Funnel (Wendel, 2013), Design with Intent (Lockton, 2010)

The alignment of and differences between Service Design and Behavioural Change is summarized in Table 1.

Aspects	Service Design	Design for Behaviour Change	Elaboration
Human Centricity	Focus on individual. Off late, factoring the concerns society	Individual, groups, and society	Aimed at individuals, embedded in the social fabric.
Locus of Value Creation	Commercial as well as for individual wellbeing and societal objectives	Mainly individual and societal wellbeing objectives. Also used in commercial settings.	Increasingly social ventures are service organizations aiming for behaviour changes.
Temporality	Short (Service Encounter) to long (Relationship)	Short (one-time change in behaviour) to long (sustained behaviour change)	Recognise that value is created through engagement over an extended time span.
Co-creation of Value	User and service provider have mutually agreed roles	Agency of change rests with the user, facilitated by other stakeholders.	Co-creation of value is critical to maximize the benefits.
Stakeholders	Primary: Service User, Service Provider. Allied:	Primary: Individual Allied: Change facilitators (government,	Harmonizing the activities of the stakeholders towards

Aspects	Service Design	Design for Behaviour Change	Elaboration
	Community, partner firms	organisations, community)	The individual's goals is critical
Contributing disciplines	Multidisciplinary	Multidisciplinary	Disciplines play a role depending on the needs
Role of Technology	Enabler	Enabler	Technology is increasingly an important component

Table 1 – An abridged overview of the alignment and differences of Service Design and Design for Behaviour Change

The affinity and congruence between these two fields is noteworthy in terms of the concern for value creation over long duration, dynamic usage contexts, and accounting for diversity of users, with the recognition of the individual situated in a social context as the locus of change. Therefore, opportunities for integration of Service Design and Design for Behaviour Change can be leveraged by designers for meaningful value creation for the users.

Relevance of Integrated Competencies in Service Design and Design for Behaviour Change

With the advances in technology, a networked world and concerns such as, sustainability, human welfare is now a dominant theme for governments and businesses. Early advocacy of designers' societal responsibilities and sustainable design came from Schumacher (1973) and Papanek (1971). Social design (Armstrong, Bailey, Julier, & Kimbell, 2014), social innovation (Manzini, 2007) and Transition Design (Irwin, 2015) are recent themes. New or reframed methods have been proposed (Murray, Caulier-Grice, & Mulgan, 2010; Manzini, 2015), that are human centric, and fulfil the goals of social upliftment and sustainability. Such approaches call for an inclusive perspective when products and services are designed to alter the users' behaviours at micro level leading to macro changes (Brown, 2009), Brown (2010). Numerous commercial design firms as well as social organizations undertake projects aimed at changing people's behaviours for their betterment – be it encouraging washing hands to reduce infections (IDEO, 2013; Hulland, et al., 2013) to socio-technical design to improve compliance to medication (U.S. Patent No. Patent No. 5,646,912, 1997), and managing diabetes (Burns, Cottam, Vanstone, & Winhall, 2006), to cite a few examples.

Wicked problems (Rittel & Webber, 1973) rooted in ambiguity, contradictory, ever changing requirements and complex inter-dependencies of stakeholders abound in societal situations. Though it might appear that radically different design approaches are necessary, Margolin & Margolin (2002) suggested that “Social Model” of design and “Market Model”, are two ends of a spectrum. The former tackles complex problems, while the later might be adequate for complicated problems. Rittel's (2010) suggestions too resonate with established design practices. Therefore, it appears that the conventional methods and practices of designers could be successfully adapted for addressing ill-structured or wicked problems, particularly in a multidisciplinary or trans-disciplinary and participatory paradigm. The concept ‘responsive design’ (Burns, Cottam, Vanstone, & Winhall, 2006) suggested elements of such a paradigm: iterative refinement of the brief, interdisciplinary collaboration, participatory design methods and techniques, building capacities of people and organisations to continually ‘redesign’ to emergent contexts, and aiming for fundamental change through design interventions. Capabilities arising from a synthesis of Service Design and Design for Behavioural change could be important, may be critical component of such a paradigm.

To adopt and adapt the paradigm in the Indian context, it is necessary to understand the challenges that are wicked, deep, and complex due to the diversity of the social, cultural, and economic conditions. Design education has to perform the foundational role to enable designers to tackle the challenges.

The Emerging Indian Context and Design Scenario

The Contexts and Trends in the Societal, Technology and Business Environment in India

Effort to solve a wicked problem reveal additional problems, create new problems, or at times, result in unanticipated benefits as well, including the changes in peoples' behaviours. Two examples from India are illustrative. A cornerstone of the Government of India financial inclusion drive in 2014, was Jan Dhan ("People's Wealth") accounts. The "nudge" came through opening full-service bank accounts with a "zero balance" requirements for the poor, many who had not seen the inside of a bank branch. Over 300 million accounts were opened in the subsequent year (Mission-FI, Department of Financial Services, Government of India, n.d.). The social benefits received in cash previously, were credited directly to the accounts of the beneficiaries. Positive behavioural changes noticed were, increased likelihood to save and reduced alcohol and tobacco addiction (Gupta, 2016). Another instance is the controversial "demonetisation", in November 2016 invalidating large value currency notes. The intent was to attack the undercover, "black" economy and tax evasion. A concurrent drive, "Digital India", was launched, supported by a secure, robust digital transaction infrastructure (Unified Payment Interface). A mobile app for person-to-person as well as person-to-business money transfer was a key touch point of the service system. Some of its "design" elements are noteworthy. It was named "Bharat Interface for Money (BHIM)", a term with mythological connotations of strength, and a modern connotation of social empowerment. The app was developed and deployed by the government to instil trust. Privacy was assured as there was no requirement to reveal identity or personal details to the other party. The transaction was designed to be as simple as sending an email. There was large scale promotion through media and incentives for use. After a year, there were five million active users (Forbes India, 2017). These cases demonstrate the power of Designerly systemic interventions comprising coherent multi-tiered, interlinked components at policy to micro level that led to behaviour change at scale.

Along with the challenges, there are several enablers as well. India is a global leader in mobile internet usage (85% of 355 million Internet users). The number is about twice that in the US. (Meeker, 2017). Widespread mobile connectivity and continually lowering data costs (Approximately USD 2 per month for 60 GB data of 4G speeds) offer a leverage for innovative services that can effect positive behavioural change. Challenges such as number of languages (22 official languages, each with over 1 million active users), large rural population, and socio-political diversity can be converted to opportunities through the power of design to imagine services that align to the end users and make a difference. There is a growing, widespread appreciation in India that designers can play a vital role in betterment of and innovations in public services for meeting the social challenges (Confederation of Indian Industry (CII), 2015).

The Landscape of Design and Design Education in India – Institutional, Formal, and Informal

A National Design Policy (Government of India, 2007) was formulated a decade ago to promote design profession and education. Design Council of India, a government backed body was formed comprising eminent designers, academicians, industry leaders, and policy makers. Though the policy focusses on increasing the competitiveness of businesses, it recognises the crucial, wider role of design as a differentiator. Government services, businesses as well social enterprises² are increasingly services focussed and have leveraged

² We recognise the pitfalls in naming specific ventures with a range with varied objectives and services models. The following names are illustrative, with no intention to diminish the credit to other significant change makers. Examples: Arvind Eye Care System (<http://www.arvind.org/default/Index/default>), Hasirudala (<http://hasirudala.in/>), Akshaya Patra

Designery ways. However, a mere redesign of existing products, physical or digital is insufficient to create scalable value and positive behaviour change in all sectors, for wide variety of customers and citizens. Thoughtful service design blended with design for behaviour change may turn out to be essential for the reimagined, innovative solutions. It appears though that the stakeholders lack adequate comprehension of the contribution Service Design could make to businesses as well as societal initiatives. For instance, Service Design or Design for Behaviour Change does not feature in the CII report (2015).

Two premier government backed design schools (National Institute of Design, and Industrial Design Center, IIT Bombay) were founded six decades ago. The number of state funded as well as private design schools has gone up significantly since then. Research and professional conferences such as ICORD, India HCI, and UXINDIA have been held since over a decade. The spread and depth of the disciplines taught has increased vastly to encompass Product Design, HCI, User Experience Design, Visual Communication, and others. However, the correct estimate of the number of schools or designers is difficult, since India does not have a standard definition of “professional designer”. A large number of “designers” might not be formally trained (British Council, 2016). The report estimated approximately 7,000 qualified designers and 5,000 students in various design schools. A contemporary estimate was 35,000 design professionals (Confederation of Indian Industry (CII), 2015)! Regardless, a large body of practicing “designers”³ can be safely assumed. Despite the apparent absence of any institute that offers education in Service Design, a large number of designers might be self-educated, taking advantage of a range of online options, short courses conducted by design schools as well as training provided by their employers.

Worldwide calls for making changes in the curriculum and focus of design education have been voiced. It was suggested that design education programs have not evolved to suit the changes in the world (Kolko, 2010). As a result, students learn traditional and irrelevant methods and techniques. Norman and Klemmer (2014) argued that the present design education approaches lack a solid foundation of knowledge essential to tackle the complexities of today’s world. They stressed the need to incorporate in design education the societal issues, persuasion (or behaviour change, in a broader sense), and understanding of complex and interdependent systems. A balance of generalist design skills and in-depth specialisations, Service Design being one of them, was advocated. Similar ideas were expressed elsewhere (McCullagh, 2010), and in India too (De Parker, 2013). Besides, there was emphasis on building ‘T shaped designers’, that is, the designers who have wider set of knowledge and skills, as well as strong capabilities in their specialisation (Fleischmann, 2014). It appears, specialised, relevant knowledge and skills, need to be blended with broader capabilities that enable trans-disciplinary collaboration to address the challenges in the Indian context.

To meet the challenges such as education for all, livelihood creation, sustainability, smart cities, clean India, Digital India and effectively delivering public services, India needs a large number of designers that can synthesise several disciplines. Service design and design for behaviour change would be important constituents of the blend. The first step towards meaningful action by educational institutions and other stakeholders, is to assess the current state of readiness of the designer community in India. It appears such an attempt has not been done yet. The study reported here is probably the first exploratory step.

(<https://www.akshayapatra.org/>), Goonj (<http://goonj.org/>), Rang De (<https://www.rangde.org/>), Meghashala (<http://www.meghashala.com>).

³ A rough estimate of the designers formally trained in National Institute of Design and Industrial Design Center (IIT-Bombay) alone is in the range of 5000 to 7000.

Objective of the Study

India Design Report (2015) recognised the demand for services and service design in India. However, there does not seem to be any research regarding the extent to which design professionals in India perceive the relevance of and practice service design. The objective was to carry out an exploratory study to obtain the current picture of appreciation, state of relevant knowledge and skills, and practice among the design professionals regarding service design and design for behaviour change. Being an exploratory study, a corollary aim was to identify directions for future research, and hopefully suggest some indicative actions.

Methodology

This research is based on a mix of qualitative and quantitative data. A survey questionnaire was developed and administered among Indian designers. Some of the key details sought were: view on service design and service design practice oriented towards behavioural change, nature of the organization where they work, their current role. In order to understand the various dimensions of the current state of the service design practice in India and design for behaviour change, aspects such as customer demand, the design process, the influence of organisation contexts and the outcomes were included. The questions were mix of multiple choice and free text format.

We adopted the four steps for survey questionnaire design (Cooper, Schindler, & Sun, 2006).

Step 1: Research questions (RQ) that articulate the research objectives in the form of interrogative sentences

Step 2: Investigative questions (IQ): The questions that elaborate the research questions to bring out the aspects that would be investigated

Step 3: Measurement questions (MQ): The analysable questions linked to the Investigative questions

Step 4: Survey questions (SQ): The exact form and content of the questionnaire

The scope of the survey encompassed:

RQ: To what extent do the practitioners understand distinctiveness of service design?

RQ2: Do their clients understand the need for behaviour change?

RQ3: To what extent practitioners have the knowledge of behavioural change theories?

RQ4: To what extent practitioners understand behavioural change practices?

Table 2 illustrates the hierarchy and linkage to survey questions for RQ1.

Research Question	(One of the) Investigation Question	(One of the) Measurement Question	Final Survey Question (measurement through a Likert Scale)
To what extent the practitioners understand distinctiveness of service design?	What do we mean by understanding? What do we mean by extent? What do we mean by distinctiveness ?	<i>Do practitioners understand that service design and UX design are different?</i> - scope - user research methods - design concepts - design detailing - design validation	<i>I believe service design and UX design are different on the following aspects</i> - Scope - User Research Methods - Design Concepts - Design Detailing - Design Validation

Table 2 – Hierarchy and linkage to survey questions

Table 2 depicts the measurement question pertains to the *distinctiveness* aspect of investigative question. The *extent* aspect was covered through the Likert scale (*Significantly different, Moderately different Almost Identical, Identical, I don't know*). Other questions in the questionnaire followed a similar hierarchical linkage.

A pilot study (N=5) was conducted to identify issues in the content, articulation and administrative aspects (time required to fill the questionnaire, ease of online answering ...). The survey questionnaire was revised based on the results of the pilot study. The complete questionnaire is available at <https://goo.gl/forms/UDH5RTngjNKyO6e23>

The sample comprised designers who were likely to be working in services organizations or for clients in services business. Anecdotal and informal data suggests the designers in India, particularly those from UXD are moving towards service design practice. Convenience and snowball sampling targeted this set of designers. Designers with minimum two years of experience were identified through industry contacts, as we wanted participants with adequate exposure to industry and design practice. The link to the online questionnaire along with a covering note were sent to them, along with a request to forward the questionnaire to other designers who match the criteria. Respondent anonymity was ensured throughout. The questionnaire reached 100 plus designers and we received 33 fully completed responses. Nine respondents voluntarily provided additional information over email and phone, which was analysed subsequently.

Analysis and Interpretation

Understanding of Service Design and its Practice

Service design discipline in India appears to have moved from a nascent stage in the consciousness of practitioners. The practitioners seem to be familiar with the domain and are working towards maturity by acquiring additional knowledge and its application.

65% respondents believed that scope of service design and UX design are different and 85% respondents were aware that the User research methods are similar for service design and UX design. As indicated in the figure 1, close to 40% respondents were aware of the key service design methods and concepts, but they lacked a comprehensive awareness. Therefore, it appears that the awareness of service design and interest is growing and practitioners might be on the path of maturity.

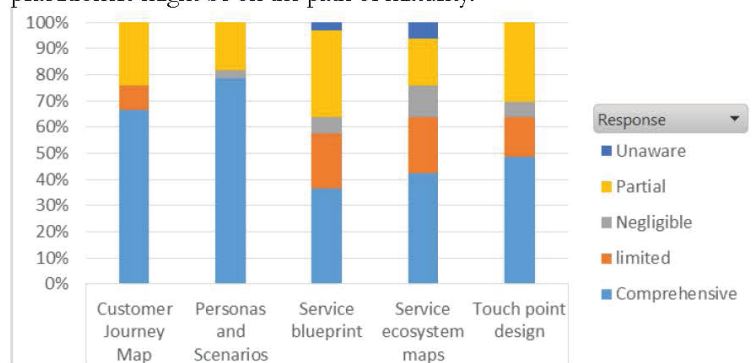


Figure 1 – Practitioners knowledge of service design methods and techniques

A significant proportion (50% respondents) is getting opportunities to apply their knowledge of service design processes, methods, and techniques. However only 6% respondents indicated Service Design as their primary expertise, which means that the practitioners were probably trying to acquire necessary knowledge and skills in service design on their own. It is a positive sign for the future maturity of the field in India.

Understanding of Behavioural Change Aspects

The responses pointed to several contradictions which indicates a significant lack of understanding, misunderstanding and limited or low level of knowledge about Design for Behavioural Change.

Interestingly, 36% respondents indicated that design briefs for their projects explicitly specified the behaviour change outcomes. It indicates that there is a demand for the service design for behavioural change, but they are not able to access the brief appropriately. Awareness, education seems to be one narration in which intervention is required.

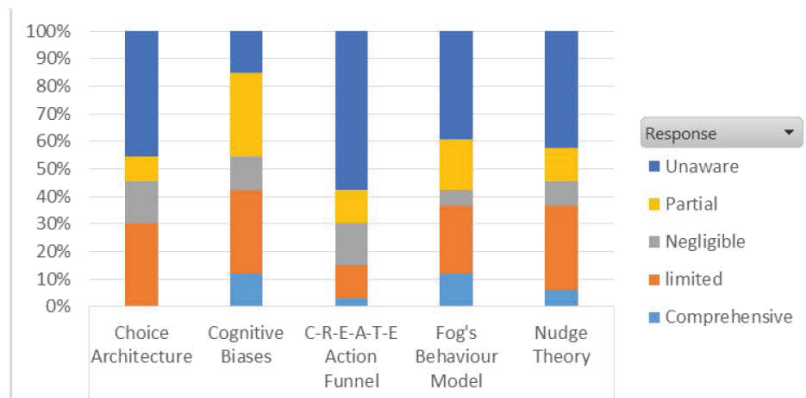


Figure 2 – Practitioners knowledge of the theories related to influencing behaviour

More than 50% respondents are unaware of the knowledge of well-known behavioural theories and models as shown in figure 2. About 5% claimed to have comprehensive knowledge of some of them and only 6% respondents had seen theories related to influencing behaviour applied in practice. It correlates with the lack of awareness about it. Cognitive biases seem to be relatively better known since 40% respondents were aware of it. However, 40% respondents indicated that they had to modify the generic way of designing services that successfully influenced user behaviour during last two years. The implied claim that they were able to assess the need and act on it seems contradictory to their level of knowledge.

52% respondents indicated that their user research team was not keen at looking for the information relevant to influencing user behaviour. However, 33% respondents believe that they have the capability to uncover the aspects related to influencing behaviour. 40% respondents occasionally validate their service design solutions from perspective of influencing user behaviour. The claim though cannot be taken at face value, as we cannot be sure what is being validated in view of the widespread lack of knowledge and understanding of behavioural theories and models. Additional in-depth assessment is needed to throw more light.

Challenges in an Organizational Setting

It was clear from the responses that generic service design processes need to be adapted to suite the organizational settings. It also pointed out the improvement areas such as creating the predefined design success criteria and ascertaining the success of the design solution after it goes live.

Organizational settings demand collaboration between multidisciplinary teams that might not be collocated. Therefore, it was not surprising that 42% respondents had to modify the generic design processes to suite their own setting. 40% respondents made trade-off in primary user research and 30-40% respondents have done trade-off in all aspects of design life cycle. In order to draw meaningful conclusions, these aspects need further investigation to ascertain whether it is a widespread phenomenon or confined to certain kind of organizations or design situations or business demands.

A significant proportion (37%) of respondents stated that they do not ascertain the success of the design solution after it goes live. An alarming revelation is that 73% designers rarely, if ever use any predefined design success criteria.

Most of the respondents (73%) were employed by IT Product or Services Companies. Interaction design emerged as the most common design expertise with 82% respondents stating it as their primary expertise. Interestingly, 6% respondents indicated the service design as their primary expertise which suggests the growing interest in spite of lack of formal educational opportunities in service design.

Insights from Qualitative Data

Qualitative data provided triangulation and enriched the insights such as knowledge gaps in relation to as well as ignorance of certain concepts and practices as well as the current organizational challenges in implementing service design and design for behaviour change.

Apart from the survey data, nine respondents reached out voluntarily through email and over the phone to share their reflections upon the experience of answering the questionnaire.

Three of them acknowledged that the survey helped them to realize their own inadequate knowledge and even a lack of awareness of certain concepts and practices. Their expressions were "... I enjoyed answering the questions. It was enriching learning experience..." An experience designer expressed their inability to execute the service design projects as, "Since the number of projects with service design scope in our context are quite a few, in most projects it was up to us to stretch it..." It is a positive sign that designers are willing to learn and apply the service design practices wherever possible.

However, six respondents who had not completed the survey expressed their inability to complete the survey and shared multiple reasons. One of them said, "I have not completed the survey because the questions are difficult for me to understand (because of my lack of knowledge) and to provide correct responses... I may be the dumbest of the lot to whom you circulated the questionnaire..." Another designer said, "Lot of terms look new to me and hence I am not able to answer the questionnaire". A passionate designer called us and said, "I tried filling this survey but a lot of questions did not make sense to me (that is, I was not even aware of the topic of the question)." Interestingly, a designer reflected on their own understanding of the term "service design": "Started filling the survey questionnaire, but I had never come across most of these concepts. Is it really relevant for service design?" After interacting with them, it came out that it was not the articulation of the questionnaire which was bothering them, but the content which was not matching with their understanding of service design. It clearly shows intervention is required to educate designers about service design. In addition, a designer expressed the organizational challenges in a detailed email. The gist of it was - "... the truth of the matter is, in my professional orgs they are still struggling to implement Usability/UX as a practice. They end up doing some bits and pieces of service design in the sense of multi-channel UX...". However disheartening, arguably the quote broadly characterises the current state of affairs regarding the service design practice in India.

Conclusions and Discussion

Design profession has matured in India and the disciplines such as product design, usability, and UX design are contributing to businesses and society. However, Service Design as well as Design for Behaviour Change as disciplines and practices have made only modest progress on the path of maturity. Prima facie, wider adoption of service design in India has a range of issues. It seems design practitioners and businesses do not yet have appreciation and understanding of the significant role service design and behavioural change can play in addressing the current opportunities and challenges. A key gap is the inadequate attention and efforts of educational institutes, organisations and professionals towards attaining maturity in Service Design and design for Behavioural Change. However, due to factors such as, awareness and initial forays in practice, the professionals are positioned to build on the base of maturity of related disciplines and contribute in addressing wicked problems of behaviour change in social as well as organisational context, if the momentum of the progress is maintained. This calls for appropriate interventions by several kinds of stakeholders, industry, education institutes, fellow professionals, associations and governments. To sum up, *Service Design appears to be in a nascent stage and Design for Behaviour Change is also in a similar state. Because of the maturity of the design disciplines and practice in general, the foundation for the professionals to venture into Service Design for Behaviour Change is in place.*

This study helped to understand the knowledge gap in Indian design professionals regarding service design and design for behavioural change, albeit in a broad and indicative manner. It revealed the need for comprehensive service design education including focus on behaviour change. The growing Indian service economy has created various opportunities for businesses. India also faces a plethora of wicked problems such as tackling corruption, traffic and transportation problems, slum settlements. Together, these present exciting and meaningful opportunities for service design professionals to make a difference. It seems several facilitating conditions such as Government enablers, maturity of design education, and presence of supportive industry and professional bodies are in place.

There were limitations in terms of the nature and size of the sample. To overcome the limitations to an extent, the survey data was triangulated with qualitative inputs from respondents as well as with informal inputs from educators and practitioners. This provided a relatively sound ground to the conclusions. Since we did not explore all kinds of design practitioners, as well as varied settings (for example, it did not include those in social impact ventures), it is recommended that future studies may encompass a larger and diverse designer population. Future in-depth investigations could focus on the causes, constraints and enabling factors which could help designers in India to successfully address the issues and opportunities uncovered. As well, future studies could focus on the problems and businesses where service design is applied, and behaviour change play a greater role in it. In this regard, social ventures might deserve special attention. It is expected that as time passes the practice and research in service design in India will mature. Therefore, periodic studies to assess the directions in which the field is evolving in India and identifying the interventions needed to strengthen the maturity process would be beneficial.

The study emphasized the various implications for the practitioners, industry, and educators in India. Positive signs and contradictions in relation to service design knowledge and practice were uncovered. As human behaviour plays a crucial role in service design, practitioners need to have sufficient knowledge about the various behavioural change models and theories. Practitioners seem to be learning on their own and they could access material available online. Currently, there are very few formal avenues to access to this knowledge though and hence actions to enhance that are required. Industry and professional bodies can play enabling role in creating formal avenues for practitioners to gain the required knowledge. Incidentally, most of survey respondents (73%) were employed by the large organization like IT Product or Services companies. Several such organisations and those from other sectors have in-house learning and development (L&D) departments which can take the lead to develop service design expertise. Several educational institutes as well offer learning opportunities to working professionals, which can play a significant role.

Indian educators need to play a crucial role in helping practitioners and industry to develop these skills in a systematic manner. Preparing the design students to meet new challenges and tackle the complex problems in a holistic manner is also a pressing requirement. Teaching design students the relevance and application of behaviour change and service design would be a key component of such a program. Collaborative efforts involving industry experts in designing the service design course as well as established institutes which are matured in service design could make the programs effective. These are the required ingredients to address the wicked problems in the Indian context.

The industry will benefit by recognising the need and urgency of service design to solve the wicked problems and develop these skills in their organizations. Encouraging designers to work on societal issues that provide the opportunity to hone skills may benefit the organizations to institutionalise the knowledge and apply in their business situations. The legal mandate that organisations must spend a part of their profits to fulfil Corporate Social Responsibility (CSR) could be a good avenue. Previously several Indian businesses were catering to customers from other countries. Thus, the design professional had limited or even no access to the end users. However, businesses are increasingly catering to the Indian

market, which provides easy access to the end users. This is a significant enabling situation. Instead of focusing only on the fragments of problems, now the industry can solve holistic problems. Such a push from the industry will help to expedite the maturity of service design practice in India.

Indian society and businesses are facing challenges and are in front of opportunities that could benefit from a synthesis of service design and design for behavioural change. This study opens the discussion about the Indian landscape of the appreciation, actions, and practice of service design.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50, 179-211.
- Armstrong, L., Bailey, J., Julier, G., & Kimbell, L. (2014). *Social design futures: HEI research and the AHRC*. Arts and Humanities Research Council. University of Brighton, UK.
- Bandura, A. (1986). Social foundation of thought and action: A social-cognitive view. *Englewood Cliffs*.
- Bitner, M. (1992, April). Servicescapes: The impact of Physical Surroundings on Customers and Employees. *Journal of Marketing*, 56, 57 - 71.
- British Council. (2016). *The Future of Design Education in India*. New Delhi, India: British Council.
- Brown, T. (2009). *Change by design*. HarperCollins Publishers.
- Brown, T. (2010, May 29). IDEO's Tim Brown on Using Design to Change Behavior. (R. Jana, Interviewer) *Harvard Business Review*. Retrieved from <https://hbr.org/2010/03/design-to-change-behavior-tips>
- Buchanan, R. (1992). Wicked Problems in Design Thinking. *Design Issues*, 8(2), 5-21.
- Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). *Transformation Design*. London: Design Council, UK.
- Confederation of Indian Industry (CII). (2015). *India Design Report*. New Delhi: Confederation of Indian Industry. Retrieved December 11, 2016, from <http://www.cii.in/webcms/Upload/a2.pdf>
- Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods*. Irwin New York: McGraw-Hill.
- Cousin, D. S. (1997). *U.S. Patent No. Patent No. 5,646,912*.
- De Parker, I. (2013). Reflecting on the Future of Design Education in 21st Century India: Towards a Paradigm Shift in Design Foundation. *ICoRD'13 The 4th International Conference on Research into Design* (pp. 1165-1176). Chennai, India: Springer, India.
- DEFRA. (2008). *A framework for pro-environmental behaviours*. London,: DEFRA.
- Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). MINDSPACE: influencing behaviour for public policy.
- Fleischmann, K. (2014). Design futures-future designers: give me a "T?". *Studies in Material Thinking*, 11, 1-23.
- Fogg, B. J. (2009). A behavior model for persuasive design. *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.
- Fogg, B., & Hreha, J. (2010). Behavior wizard: a method for matching target behaviors with solutions. *International Conference on Persuasive Technology* (pp. 117-131). Springer.
- Forbes India. (2017, September 17). *The changing banking landscape*. Retrieved from Forbes India: <http://www.forbesindia.com/article/sponsored/the-changing-banking-landscape/48189/1>
- Forlizzi, J., & Battarbee, K. (2004). Understanding Experience in Interactive Systems. *DIS '04 Proceedings of the 5th conference on Designing interactive systems: processes, practices, methods, and techniques* (pp. 261--268). Cambridge, Massachusetts, USA: ACM. doi:10.1145/1013115.1013152

- Government of India. (2007). National Design Policy. Department of Industrial Policy & Promotion. Retrieved from dipp.nic.in/sites/default/files/national_design_policy%20%20%20eng%201.pdf
- Granovetter, M. (1978). Threshold models of collective behavior. *American journal of sociology*, 83, 1420-1443.
- Gupta, S. (2016, October 16). *Jan Dhan accounts keep villagers sober, slow rural inflation: Study*. Retrieved October 17, 2017, from Times of India: <https://timesofindia.indiatimes.com/india/jan-dhan-accounts-keep-villagers-sober-slow-rural-inflation-study/articleshow/61095142.cms>
- Hassi, L., & Laakso, M. (2011). Making sense of design thinking. In T.-M. Karjalainen, M. Korja, & M. Salimäki (Eds.). Helsinki: DBM Program, Aalto University.
- HM GOVERNMENT. (2005). *Securing the future: The UK Government Sustainable*. London,: HM GOVERNMENT.
- Irwin, T. (2015). Transition design: A proposal for a new area of design practice, study, and research. *Design and Culture*, 7(2), 229-246.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.
- Kolko, J. (2010). Remapping the Curriculum. *AIGA Design Educators Conference - New Contexts/New Practices: Six Perspectives on Design Education*. Raleigh: AIGA, the professional association for design. Retrieved from <http://www.aiga.org/new-practices-six-perspectives-on-design-education>
- Kolko, J. (2010). *Thoughts on interaction design*. Morgan Kaufmann.
- Kolko, J. (2012). *Wicked Problems: Problems Worth Solving - A Handbook and Call to Action*. Austin , Texas 78711, USA: Austin Center for Design.
- Kolko, J. (2015). Design Thinking Comes of Age. *Harvard Business Review*, 93(9), pp. 66-71.
- Leonard, T. C. (2008). Richard H. Thaler, Cass R. Sunstein, Nudge: Improving decisions about health, wealth, and happiness. *Constitutional Political Economy*, 19, 356-360.
- Lockton, D. (2010). Design with Intent: Influencing people's behaviour through products & services. In B. University, *Made in Brunel: 250 Innovative Ideas*. London: Papadakis.
- Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin*, 3-9.
- Manzini, E. (2007). Design research for sustainable social innovation. *Design research now*, 233-245.
- Manzini, E. (2011). Introduction to Design for Services. In A. Meroni, & D. Sangiorgi, *Design for Services* (p. 3). Farnham, England: Gower Publishing Limited.
- Margolin, V., & Margolin, S. (2002). A "Social Model" of Design: Issues of Practice and Research. *Design Issues*, 18(4), 24-30.
- Martin, R. L. (2009). *The design of business: Why design thinking is the next competitive advantage*. Harvard Business Press.
- McCarthy, J., & Write, P. (2004). *Technology as Experience*. London, England: The MIT Press.
- McCullagh, K. (2010, September 24). *Is It Time to Rethink the T-Shaped Designer?* Retrieved August 9, 2017, from Core77: <http://www.core77.com/posts/17426/is-it-time-to-rethink-the-t-shaped-designer-17426>
- Meeker, M. (2017). *Internet Trends 2017 – Code Conference*. San Francisco, USA : Kleiner Perkins. Retrieved from <http://www.kpcb.com/internet-trends>
- Meroni, A., & Sangiorgi, D. (2011). *Design for services*. Gower Publishing, Ltd.
- Michie, S., Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science*, 6(1), 42.
- Mission-FI, Department of Financial Services, Government of India. (n.d.). *Pradhan Mantri Jan Dhan Yojana: Scheme Details*. Retrieved September 28, 2017, from Pradhan Mantri Jan Dhan Yojana: <https://www.pmjdy.gov.in/scheme>
- Norman, D., & Klemmer, S. (2014, March). *State of Design: How Design Education Must Change*. Retrieved June 16, 2016, from <http://www.jnd.org>: http://www.jnd.org/dn.mss/state_of_design_how.html
- Papanek, V. (1971). *Design for the Real World: Human Ecology and Social Change*. Thames & Hudson.

- Prahalad, C. K., & Ramaswamy, V. (2004). *Future of Competition: Co-Creating Unique Value with Customers*. Harvard Business School Press.
- Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American journal of health promotion*, 12, 38-48.
- Reckwitz, A. (2002). Toward a theory of social practices: a development in culturalist theorizing. *European journal of social theory*, 5, 243-263.
- Reserve Bank of India. (2017). *Handbook of Statistics on Indian Economy*. Retrieved September 25, 2017, from <https://rbi.org.in:https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy>
- Rittel, H. W. (2010). The Reasoning of Designers. In J.-P. Protzen, & D. J. Harris (Eds.), *The Universe of Design: Horst Rittel's Theories of Design and Planning*. New York, NY 10016: Routledge.
- Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*(4), 155-169.
- Rogers, E. M. (2003). *Diffusion of Innovations*. Free Press.
- Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health education monographs*, 328-335.
- Schumacher, E. F. (1973). *Small Is Beautiful: Economics as if People Mattered*. Blond & Briggs.
- Simandan, D. (2013). Introduction: Learning as a geographical process. *The Professional Geographer*, 363-368.
- Stanton, N. A., & Baber, C. (1998). Designing for consumers: editorial. *Applied Ergonomics*, 29, 1-3.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.
- Wendel, S. (2013). *Designing for behavior change: Applying psychology and behavioral economics*. "O'Reilly Media, Inc."
- Yu, E., & Sangiorgi, D. (2014). Service design as an approach to new service development: reflections and futures studies. *ServDes 2014 Fourth Service Design and Innovation Conference "Service Futures"*, (pp. 194-204).

Appendix

5

Quasi

Participatory

Service

Design for

Reimagining

Corporate

Services: A

Case Study

ServDes 18,

Milano, Italy

2018



POLITECNICO
MILANO 1863

SCUOLA DEL DESIGN
DIPARTIMENTO DI DESIGN

POLI.DESIGN

ServDes2018 - Service Design Proof of Concept
Politecnico di Milano
18th-19th-20th, June 2018

Quasi-participatory service design in organizational context: A case study

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Abstract

Service Design is about creating a desirable end-to-end experience for service-users. Participatory design involving service-users and stakeholders is an established paradigm in service design. There are constraints as well as opportunities while designing for organizational services. The Participatory design paradigm is appropriate in this context, however, the traditional participatory design methods have limitations and need to be adapted to overcome the constraints and leverage the enablers. The suggested approach comprises the aspects: a mix of tacit and explicit knowledge, synchronous and asynchronous working, full and partial participation, and a mix of 'lite' and in-depth application of design methods, and leveraging the knowledge externalization techniques. This service design case study is about high-touch hiring and joining experience of new entrants in a large IT organization. The outcomes confirm the benefits of the proposed approach suggesting its appropriateness for designing services within organizational context. It also offers the promise of wide applicability.

KEYWORDS: participatory design, service design, organizational services, tacit knowledge, employee onboarding, quasi-participatory design

Introduction

Ideas such as 'collaboration', 'working together', 'co-design', and 'participatory design' are widely discussed in the design field. In the era of specialized knowledge workers, it is imperative that employees of organizations master the art of collaboration to succeed in today's highly dynamic and networked world. Collaboration is essential and beneficial, but it has its own challenges such as conflict and disagreement in the team, business functions wrangling, snail-paced decision-making, and bureaucratic tangles. Unless these challenges are overcome, collaboration is likely to fail (Weiss & Hughes, 2005). For successful collaboration which goes beyond cooperation or teamwork, the process must ensure that every contributor's voice is heard and acknowledged. The elements of cooperation are knowledge

sharing and performing assigned tasks, but it might not imply generative interactions, debate, and working towards common goals (Campbell, 2011). Innovation culture can be nurtured through effective collaboration of employees (Kelly & Schaefer, 2014). Trust, communication, a shared vision and a purpose are critical for effective collaboration. Participatory Design hinges on successful collaboration among experts from diverse fields to come up with design outcomes that are useful, usable, and innovative. Involving not only primary end-users but also secondary end-users and other stakeholders was found to be useful in participatory service design (Korpela, et al., 1998).

Services are multi-dimensional, complex, intangible, and heterogeneous in nature. Hence there is a need to include various stakeholders who have a stake in the success of the design outcomes. These stakeholders are likely to have different kinds of knowledge and expertise which could strengthen the multidisciplinary collaboration. To design user-centric services, designers need to understand the expectations and needs of the users; keeping in mind the service context and environment. Different stakeholders also enrich the understanding of service situation. As a result, participatory design is gaining ground across domains (Sangiorgi & Clark, 2004).

Organizational Context and Organizational Services

Increasingly the organizations are turning to in-house service design teams for business purposes and for internal services (Blomkvist, 2015) (Mrad, Vandertuyn, & Mahraj, 2015) (live | work, 2016). Service design within large organizations can however be markedly different compared to design done through external design consultancies (Atvur, Rau, & Wilson, 2015) (Marlovits, Fischl, & Mang, 2015). The organizational conditions can either aid or hamper traditional design approaches (live | work, 2016). Design teams are generally aware of organizational structures, culture, politics (Blomkvist, 2015), informal opinions, and sometimes restricted knowledge. The design teams may face challenges of support and investment from leadership (Mäkijärvi, 2015; Katz, 2015), and lack of resources or competency skills (Katz, 2015) (Beyerle & Wend, 2015). Organizational structures lead to segregation and 'department' perspectives or silos which makes sustained collaboration difficult (Atvur, Rau, & Wilson, 2015). While recognising the constraints these factors impose, they can be leveraged as well to support the design activity. For instance, a team can build long-term relationships with employees and create a knowledge pool (Mrad, Vandertuyn, & Mahraj, 2015).

The design of organizational services could be as challenging as that of services designed for clients. However, human centric, thoughtful design of organizational services aimed at employees often receives inadequate attention leading to impaired service experience and loss of morale. There is a direct correlation between positive employee attitude and an organization's business performance (Koys, 2001). Also, the employees can be co-opted as responsible organizational citizens and offered opportunities to contribute to initiatives, including in designing organizational services, through voluntary participation (Podsakoff, MacKenzie, Paine, & Bachrach., 2000). High-touch services that require empathy towards end-users might be particularly benefited by fostering a sense of 'organizational citizenship' among the stakeholders and this could lead to improved quality of organizational services.

Participatory Service Design

There is ample evidence in literature of the benefits of participatory design in general as well as in organizational contexts. Design concepts generated by participatory design teams are more innovative and useful than those generated by design professionals alone (Trischler, Pervan, Kelly, & Scott, 2017). End user as well as stakeholder participation in service design helps in gaining better knowledge of users' needs, generating out-of-box ideas, improved focus on users' needs, generation of innovative solutions that enhance service experience, and long-term benefits such as more successful innovations, increased loyalty of users and higher user satisfaction (Steen, Manschot, & De Koning, 2011). One of the keys to success in designing internal services could be the effective use of the rich tacit knowledge that stakeholders have about the end-users and the service context. Ehn (1988) suggested that participatory design attempts to steer a course 'between tradition and transcendence' that is, between participants' tacit knowledge and designers' more abstract, analytical knowledge. Therefore, participatory design methods should appropriately leverage the stakeholders' tacit knowledge and designers' explicit knowledge in a productive synthesis (Spinuzzi, 2005). The departmental and hierarchical structures of large organizations lead to, therefore, narrow perspectives or incomplete understanding of a problem (Atvur, Rau, & Wilson, 2015). A key aim of participation of multi-disciplinary stakeholders in organizational service design should therefore be to bring diverse and important perspectives together to solve complex service design problem.

The stakeholders could be motivated to participate in a design project by acknowledging the value of their skills, experience and effort towards the design outcomes (Kensing & Blomberg, 1998). It is challenging though to sustain their interest and enthusiastic participation throughout the service design life cycle. Therefore, the participants need to be selected carefully, taking into account their motivations for participation and scope of participation (Kensing & Blomberg, 1998). Further, the mix should be such as to leverage the appropriate tacit knowledge spread among various stakeholders. However, practical problems such as unavailability of team members throughout the design process, multi-location teams, and effort required in coordination remain. Participatory design takes a good deal of time, resources, and institutional commitment (Spinuzzi, 2005). The stakeholders in an organization have their own mainstream responsibilities and they might be spread across different locations (Keller, 2014). They often have business demands and unanticipated obligations which lead to interruptions or limited availability. The coordination of participatory work also requires considerable effort and time. This could lead to delays in project completion. These limitations might adversely affect the progress of the project and ability to meet the goals of design. Participatory service design studies, have exhibited challenges such as time crunch and logistical difficulties (Bowen, et al., 2013), which could get aggravated if the team is geographically dispersed; a common situation in large organizations. Learning and collaboration among stakeholders from different 'communities of practice' transcending the perspectives and paradigms of their fields morphing into 'community of interest', that is, those having shared design outcome objectives is a complex and multi-faceted phenomenon (Fischer G. , 2001). Spatial (across distance), temporal (across time), conceptual (across different communities of practice, and technological barriers prevent effective collaborative design and formation of communities of interest. (Fischer G. , 2004). A participatory design method must address these challenges.

The team had experienced such challenges previously while designing services in the organizational context using traditional participatory design process (Mahamuni R. , Khambete, Mantry, Das, & Verghese, 2016) (Khambete, et al., 2015). We discuss some of them and partial solutions which were tried out. To begin with, there was often a demand to show quick progress. A partial solution was to blend an agile approach, multiple iterations, and stakeholder workshops. The iterations also helped fortify the learning of design methods by the stakeholders, who had no previous exposure to designing. Since the participants had diverse backgrounds, skill levels, and experience levels, it was necessary to arrive at a shared vocabulary. A Pattern Language for Service Design (Khambete P. , 2013) was used to address this need. We also found early evidence that flexibility in the mode of working

(synchronous, asynchronous, sequential, individually, and so on.) along with the use of the externalised artefacts as mediators helped establish continuity across sessions, and effective collaboration leading to the overall progress. A few members of the participatory design team were not able to participate adequately due to reasons such as mainstream work pressure, change in work priorities and context change. This led to discontinuity and interruption of the functioning of the participatory team. Sometimes new members were added to the team as their replacement which led to considerable additional effort to bring everyone on the same page and to ensure the quality of the engagement, their motivation and enablement to contribute. There were occasions where insight synthesis took a lot more time than expected. All these had direct or indirect impact on the time and effort required to design the chosen services.

Along with the challenges, organizational context also provides opportunities such as the ease in accessing the stakeholders and having participatory team members that are themselves also service-users of some services and providers of others. The later offers a unique opportunity of a well-rounded set of perspectives. These opportunities are utilized in the proposed approach, which is holistic and brings together suggestions from literature and previous experiences of successful partial solutions.

Proposed Approach

To overcome these challenges and keeping the benefits of the participatory design process intact, we used a modified participatory design approach, the elements of which are explained in table 1.

Challenges	Approach elements
Time availability, multi-location	Team members working together and separately
Time availability, multi-location	Synchronous and asynchronous work
Time availability, multi-location	Team members working concurrently but from different locations
Time availability, multi-location	Facility of full or partial participation
Different kind of expertise and tacit knowledge, time availability	Distribution of work items to match the team member expertise and available time
Access to end-users, constraints on time available for user research	Enablement for leveraging tacit knowledge
Inadequacy of explicit knowledge due to constraints on time available for user research, triangulation of tacit and explicit knowledge	Synthesis of tacit and explicit knowledge through team interactions and consensus
Multi-location, fluid team, carrying forward the knowledge and common understanding throughout the design life cycle	Conversion of synthesized knowledge into shared artefacts
Multi-location, fluid team, quality of knowledge synthesis, solutions and artefacts	Planned face-to-face interactions at critical junctures

Table 1 – Challenges and associated solution elements in proposed quasi-participatory design approach

A similar approach was successfully used by Ajiboye and Ajitoni (2008) in participatory learning, where learners worked independently at their own pace and then met in groups to share the learnings. Similar to the collaboration aspect discussed in participatory design, computer-supported cooperative work (CSCW) focuses on supporting collaboration among spatially and geographically dispersed group involved in an activity, though keeping technology at its centre (Carstensen & Schmidt, 1999) (Johansen, 1988). Distributed

computing is another technological paradigm, in which a task is divided into multiple and each one of them is solved by one or more computer systems which interact with each other (Distributed computing). These different approaches in various fields give one the basis for proposed approach.

We refer to the proposed approach as quasi-participatory design as depicted in figure 1. This approach was validated in the context where stakeholders had rich tacit knowledge about service-users as described in the following section. In general, for organizational services, the service-users are its employees including the stakeholders. Also, stakeholders have regular and varied exposure to other employees which helps them to build tacit knowledge. These interactions are formal as well as informal, which help them build rich tacit understanding of service-users. As part of the service design team, the stakeholders' tacit knowledge can be uncovered through group processes and leveraged to draw insights which can inform design. In such situations, stakeholders also may come with their own biases and hence there is a need to triangulate the data with user research methods like observations, surveys and interviews.

The following section explains a service design case study in an organization, where quasi-participatory design approach was used. The study followed research through design methodology, which focuses on addressing a research problem, while also focusing on the end product of design (Godin & Mithra, 2014). We used this methodology to validate the proposed approach. In further section, we put forth actionable recommendations for service design in participatory manner.

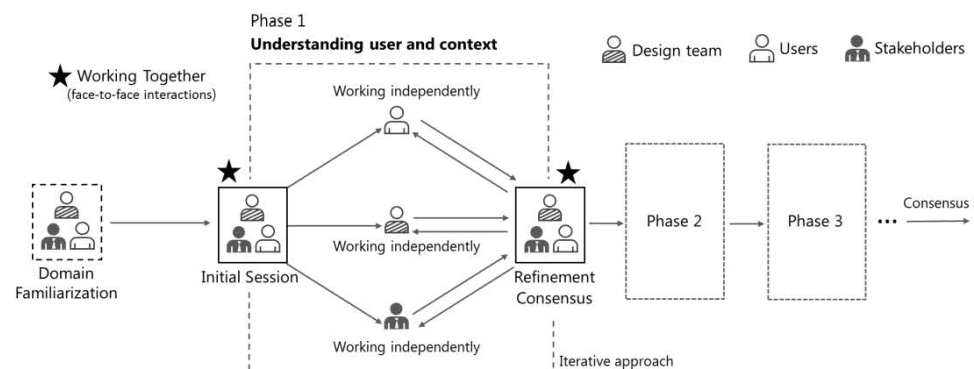


Figure 1 – Quasi-participatory Design Process

Re-Designing the On-boarding Service

It is vital to create an impactful and desirable experience of joining an organization for the candidates going through the hiring and joining process. Research has shown that new employees form their attitudes and beliefs toward their organization very early in the job, which influence their decision to remain in the organization (Bauer & Green, 1994). It is important therefore to treat every new employee as a new 'customer' that the organization is prospecting and invest in building the relationship. Organizations should ensure that not only the new employees' expectations are met but the experience in the initiation in the organization is of high quality. Taking into account time, people, and costs incurred in hiring, onboarding and training the candidate, losing new entrants, particularly the experienced professionals, leads to high monetary losses, opportunity costs and could impact the morale. This acted as a key motivation for us to redesign the existing joining and onboarding service of a large IT organization with over 350,000 employees. The team believed that the effectiveness of the onboarding program can be enhanced significantly by framing it as a 'service' where new employees will be the customers. Such a reframing shifted the focus

from simply improving operational processes to addressing each component of the service, keeping the candidate's holistic experience as the central concern. To achieve this, the design team was formed comprising of 'customers' of this service that is, employees of the organization; service owners, that is, representatives from the talent acquisition group and the human resource management group. The key areas to focus upon were identified as – creating an appropriate mix of high-touch and technology-mediated hiring and joining experience for the candidate, helping them to get assimilated in the project teams in the initial period of one year after joining, thereby reducing the attrition of newly hired employees.

The stakeholders identified the hiring and onboarding phases as shown in figure 2. The brief activities associated with the phases are **Considering job change** – usually while employed at another company; **Exploring options** – including various employment platforms, social media and contacts; **Applying for a job** through the organization's career portal or other channels such as referral programs and emails; **Selection phase** –primarily, interviews of the accepted applicants; are scheduled and conducted; **Acceptance phase**–the candidate receives an offer letter, along with details about the job; **Joining preparation** –the candidate conveys the acceptance of the offer, and initiates arrangements such as providing authentic documentation, possibly for relocation, , and leaving the prior employment; **Onboarding**–the candidate joins the organization and attends induction sessions. This is followed by assignment to a project which has an 'Initial phase' in which necessary infrastructure and support is provided, a longer '**Assimilation phase**', and at the end of one year an event, celebratory **Joining anniversary**'.

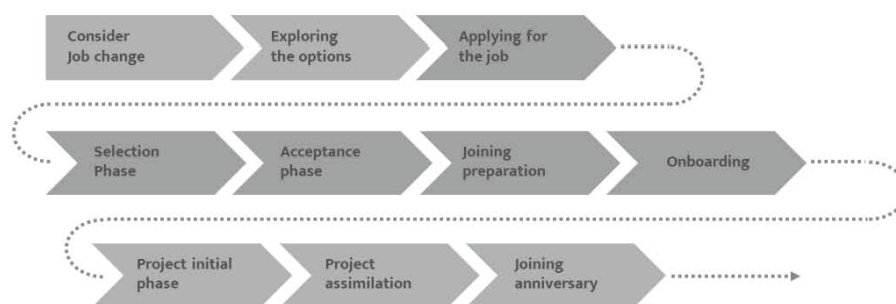


Figure 2 – Candidate journey from phase of considering the job change till joining anniversary

Participants

The service-users included candidates and new employees that had joined through “lateral hiring” (that is, professionals with experience ranging from 2.5 years to 12 years) who participate in the hiring and joining process. The service providers included interviewers, recruiters, trainers, human resource teams, project managers and other employees of organization (who could be acquaintances of the service-users). The design team comprised service-users (employees at large), service owners (recruitment function and human resource management function), and people with technology background and Service Designers who acted as facilitators throughout the project. The participatory design team was spread across two different cities, but in the same time zone. Having stakeholders from different domains, different locations and who closely interact with service-users helped us understand and identify the improvement areas. Also, the team had rich tacit knowledge about the service-users due to their long period of engagement with the service uses as a part of their roles. This knowledge was leveraged whenever the service-users were inaccessible.

Method

Domain Familiarization

Members of the team lack understanding of others' work domains. Therefore, initially, the recruitment team sensitised the Service Designers about various aspects of experienced candidate recruitment and onboarding. The current challenges such as the gaps in communication, long process duration, in-process dropouts, employee satisfaction, and infant attrition were discussed. Subsequently, two workshops were held to familiarize all stakeholders with the service design concepts as well as to gel as a team. During these workshops, the explicit and tacit knowledge was captured and externalized in artefacts. The workshops enabled the stakeholders to collectively reframe the problem as 'service' and reach a consensus on the service experience goals and the data collection strategy. The participatory philosophy was followed from the earliest stages of this service design project.

Data Collection – Understanding User and Context

The data collection was done through observations, survey, and informal and formal semi-structured interviews with key stakeholders. Service Designers attended one full day of induction sessions anonymously and created observation notes. They also informally discussed with the new employees during tea and lunch breaks to know their feelings about the induction programme. They also went through the process of form filling during the induction along with the new employees. To understand the issues faced by the new employees in the organization, two survey questionnaires were developed – one for understanding the issues in the hiring phase (spanning from candidates applying for the job till they join the organization) and another for the on-boarding phase (induction and training of two days after joining). The Service Designers' observations during the induction, along with tacit knowledge from other stakeholders, was the basis for the design and development the survey questionnaire. Since the service-users (newly hired experienced professionals) were easily accessible during the two days of onboarding, the survey was administered at the end of second and last day of onboarding. Also, the organization has presence in several cities in India, the surveys were administered (ensuring anonymity) in two cities so as to know the differences, if any, in processes across cities. Care was taken so that both teams followed the predefined protocol to maintain the consistency and rigor of the process. The survey data was collected from 66 respondents altogether. The survey analysis pointed to several service design and execution related issues.

The team conducted in-depth semi-structured interviews of those who had joined the organization within last one year to know the details and nuances of the problem areas identified in the survey. The interviews were conducted with stakeholders as well. The interviews also probed to uncover behavioural traits of employees, based on their motivation, triggers and abilities (Fogg, 2009). Interviews were conducted in two Indian cities – Pune and Mumbai by two different teams of two or three members. Care was taken in this case as well that both team followed a predefined protocol to maintain the consistency and rigor of the process. Together, 23 formal and informal interviews were conducted spanning the representative cross-section of the stakeholders.

The collected survey data, audio recordings, and interview notes were analysed during subsequent workshops conducted by team, which resulted in identifying the key contexts, service encounters and personas. It helped us identify the negative as well as positive key scenarios in the process from user's perspective. We also understood various feelings like anxiety, apprehension, uncertainty which users go through, throughout the hiring and onboarding process.

To illustrate, we summarize some representative findings. We found that candidates as well as new employees used many informal channels to interact with each other. We also found that candidates had pre-set perceptions about large organizations, which generally led to certain expectations and allowances – for example, some candidates expected and accepted

the delays in responses from the company, though it caused anxieties. Another example was that candidates considered induction sessions as expected formalities in a large organization but were pleasantly surprised by socialization activities. We realised that it was important to understand the positive and negative preconceived perceptions about the organization the candidates might have. This will enable guiding the service design to leverage the former and counter the later.

Various activities involved in the data collection such as observations, informal discussions, surveys, semi-structured interviews, data analysis and insight collection, were carried out following quasi-participatory approach, details of which are mentioned below in table 2.

Activity (phase: understanding user and context)	Primary responsibility (Worked independently)	Secondary responsibility (Contributed in reviews and discussions)	Tertiary involvement (infrequent involvement on request)
Identification of data collection methods and schedule	Service Designers	Recruiters, HR Representatives	None
Observation during Onboarding	Service Designers	Recruiters, HR Representatives	Other stakeholders
Informal discussion with service-users	Service Designers	Recruiters, HR Representatives	Other stakeholders, Service-users
Understanding the Context	Recruiters, HR Representatives	Service Designers	Other stakeholders, service-users
Critical incidents	Recruiters, HR Representatives	Service designers (facilitating)	Service-users
Semi-structured interviews	Service-users	Service Designers	None
Survey design	Service Designers	Recruiters, HR Representatives	None
Survey administration	Service designers, Recruiters	None	Other stakeholders, Service-users
Analysis of survey and interviews	Service Designers	Recruiters, HR Representatives	None
Insights validation	Recruiters, HR Representatives	Service Designers	None

Table 2 – Activities along with participatory team member responsibilities for 'understanding user and context' phase

Personas

Persona creation is a well-established step of user-centered design process that helps designers to build empathy and identify with the service-users. In contrast to the conventional persona creation based on rigorous immersive data, the team significantly leveraged the tacit knowledge of the concerned stakeholders and created concise personas. Concise personas are similar to an assumption personas, ad-hoc personas created on the basis of tacit knowledge, but with established representativeness. To create the concise personas, differentiating characteristics of the service users and the possible service-user segments were identified. Then four to five concise personas were created per segment, using the tacit knowledge of the team which was augmented with insights from observations, survey results and interviews. The representativeness of these personas was established by

validation using the paired comparison method. The most representative personas per segment were then detailed out and further refined with inputs from service-users and stakeholders. These personas were used as primary personas throughout the design study.

While service-user segments were formed in the initial discussion within group, the initial versions of brief personas were developed by the team offline. The team then came together and through consensus finalized the brief personas. This was then subsequently validated by the team with actual service-users. In a similar manner, detailed personas were created and refined.



Figure 3 – Persona evolution from initial idea to Rapid prototype to detailed persona

Customer Journey Maps

As shown in figure 2, there are 10 phases in a candidate’s life time journey, where this study focused on the ‘applying for the job’ phase till the ‘on-boarding’ phase. The early insights received from the ‘understanding the user and context’ step, helped to define these stages, where the tacit knowledge available in the team played a very crucial role. As a part of the CJM, the team captured the service-user and business intentions along with the service-user information such as feelings, doing, actions, decisions taken, and resources available.

The team arrived at the CJM template considering the various aspects through consensus, but the Service Designers in the team played a vital role in it. The team members then decided to work on the phases independently. The team utilized the available tacit knowledge along with the insights from previous step of ‘understanding the user and context’. The CJM was progressively evolved over a period of time within team discussions.

Service Blueprinting

The team used the technique of service blueprinting to understand and map how the current service operates. Due to limited availability of stakeholders, it was not possible to understand the whole service process (including various encounters, touch points, spanning across various stages) and lay it down in a blue print form in a single day workshop. Hence the team initially had interview-like discussions with the stakeholders and jotted notes. The stakeholders too noted areas where they had doubts about the process and reverted later after independent discussions with their teams. The Service Designers used the notes to independently sketch a first draft of the blue print. These sketches were discussed in the next meeting with the stakeholders and refined with their inputs. The designers then created a detailed service blueprint per stage of the service. Wherever the team had doubts, due to the absence of services users and stakeholders, they annotated the blueprints and listed the set of doubts. These doubts were discussed over email and in further meetings with the stakeholders.

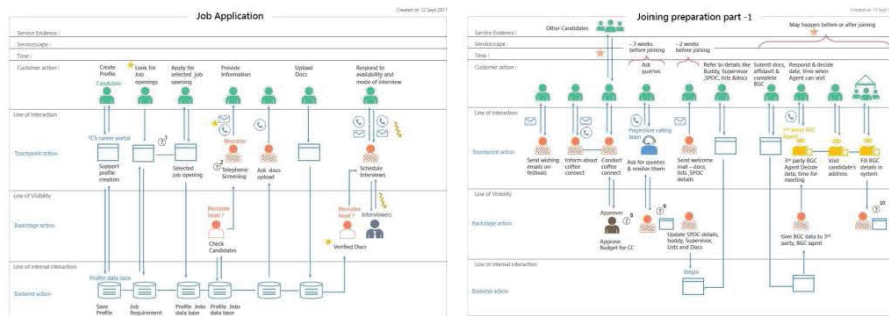


Figure 4 – Service Blueprint for two phases

Service blueprinting being a new concept for the stakeholders, they contributed mainly in terms of knowhow and helped refining the blueprint iteratively. The service blueprints were mainly created by the Designers with the help of other team members. After the initial version, all the team members got hold of service blueprints and started contributing proactively.

Idea Generation

After mapping each phase as a blueprint, the team also annotated the blueprint with insights and ideas using coloured sticky notes. Visualizations of the process in terms of blueprints helped the Service Designers to generate new ideas. Having tacit knowledge about users' expectations and needs, the painful parts of the process and service breakdown points were identified, which again led to some more ideas. While creating blueprints, the Service Designers jotted down the questions and doubts wherever they did not have visibility of what happens in the current service. Design themes were also identified during blueprint creation. Before the next discussion amongst the Service Designers and the stakeholders, a list of questions was sent to the stakeholders so that they can collect details on those if they are not already aware of the facts. Then during the team discussion, the blueprints were discussed and enhanced as per the clarifications to the questions put up earlier.

Besides service blueprinting, the team also used other ideation techniques for inspiration. Some of the significant ideas were also explained to the stakeholders, which helped in maintaining their interest in the project.



Figure 5 – Phase wise ideation and idea clustering

Service Prototyping

All the ideas for the whole user journey were represented in the form of sketches, to give an overall view of future service. The Storyboarding method was used to illustrate the future scenarios with the key ideas. The Service Designers also created a puppet-show like video to depict the selection phase of the future service.



Figure 6 – Sample storyboard

Proposed Actionable Recommendations

As explained earlier, through research through design methodology, we observed during this case study how the proposed quasi-participatory design approach unfolded and was effective. We believe that there is a possibility of its wider applicability. We suggest following this approach will improve the overall effectiveness of the participatory service design process, particularly when the teams face the constraints we have discussed (for example, time and resources, balancing the demands of job responsibilities and participation ...). Following are some of the proposed actionable recommendations.

1. Working independently and working together iteratively:

Cross-functional group stakeholders are the domain experts, who leverage their knowledge to contribute to different aspects of the design project. One of the challenges identified was to get them together all the time, throughout the project duration as they have their own work responsibilities. A way out is participation that happen in stages, where at times teams work together synchronously at one place and at other times they work concurrently but asynchronously, followed by review and consolidation, improving upon each other's outcomes. The Service Designers could also gather findings after the 'together' sessions, improve, and later meet with stakeholders again to refine further. The stakeholder representatives in the team, on the other hand could be tasked with, for instance filling gaps in knowledge in their respective spheres and evaluating in-progress concepts. Iterations of such asynchronous and synchronous working seem to be more appropriate to overcome to the challenges to effective participation by adapting to and working within the constraints of time and distance to produce quality outcomes. Another significant benefit could be that the team members will be motivated to participate throughout the project as it enables them to fit the project work in their other work commitments. In this way, one of the core principles of participatory design, that people have a basic right of autonomy or working in their own way (Simonsen & Robertson, 2012) is adhered to without compromising the benefits of collective wisdom.

2. Externalizing artefacts for team collaboration across time and locations to enable distributed cognition:

In-process artefacts help in supporting each other's thought process by transferring and refining the commonly held understanding of the problem, ideas, concepts, and solutions (Mahamuni, Khambete, & Mokashi Puneekar, 2017). These play a key role in participatory design team collaboration. While working independently, team members could create such artefacts to share their understanding and ideas in the team discussions, which will be the basis of the evolution of the artefacts. Tacit knowledge of stakeholders could also be made visible through the artefacts. The key to success is conscious efforts to build common understanding about the types and nature of the artefacts to be co-created and used in the design process (for example, Personas, Scenarios, Journey Maps, and so on.).

3. Adapting simplified versions of design methods for early engagement of stakeholders:

Though stakeholder representatives including service-users might be introduced to design methods and concepts, being novices, they may have difficulties in using the design methods that could be perceived as complex. Therefore, in the initial stages of design, the Service Designers could use methods and artefacts that the stakeholders are familiar with, but adapted to align with the design methods. For example, instead of taking notes of the discussion as a document, each point can be noted on a sticky note. The collection of sticky notes could be used to build affinities. The Service Designers could also otherwise asynchronously build a “draft” affinity diagram which can be shared and discussed with the other team members, and refined together. This approach could give more clarity of the design method to the stakeholders and ensure they do not feel intimidated, and help in building mutual trust. It could also be an effective process of team building. Therefore, it could enable them to contribute and make an impact on the outcomes.

4. Collectively representing inaccessible service-users through available tacit knowledge:

As service-users, especially external to the organization, may not be accessible every time for the design project activities, we can depend on rich tacit knowledge of participatory team and arrive at common understanding through deliberations and consensus. The emergence of trust in other team members and greater appreciation of their perspectives, an outcome of the process discussed earlier can support open and constructive deliberation and resolution of conflicts. Whenever a possibility arises, this understanding can be validated and refined to make it closer to the reality.

Conclusions and Directions for Future Work

The primary objective of this study was to validate the quasi-participatory design approach in the form that was appropriate for the project at hand. Further, we aspired to validate this flavour of participatory design approach for designing organizational services by in-house design teams. We observed that individually and collectively the elements of the approach helped to overcome the adverse impact of the contextual challenges such as unavailability of stakeholders across all the design activities, sustained engagement, and effective collaboration. The well-coordinated way of working enabled the team members to be productive together as well as independently, take advantage of the mix of the synchronous as well as asynchronous working, feel empowered by the freedom to work from multiple locations and the flexibility of full or partial participation. This helped to mitigate the adverse impact of the unavailability of stakeholders as well as the disadvantages of geographical dispersion. Distribution of work items to match the team members’ expertise and available time helped them to contribute confidently. The issues related to the access to end-users and limits on the available time for user research was mitigated through enablement for leveraging tacit knowledge within the team. It was evident in the case study that the blend of tacit and explicit knowledge supported to triangulate findings and expedited the synthesis through team deliberations and consensus. In this case study, the team was distributed across three offices from two cities, but conversion of synthesized knowledge into shared in-process artefacts helped to carry forward the knowledge and common understanding throughout the design life cycle with optimal face-to-face interactions only at critical junctures. Apart from the quality design outcomes, we also observed stakeholders acquiring a sense of ownership, developing a service-user centric mind set and a sense of accomplishment. We consider it as a significant achievement as perforce there is a likelihood of conflict of interest, say in a recruiter’s objectives and the service user’s (that is, job applicant’s) expectations.

We acknowledge that this approach was validated only in the organization context and the design output was validated with a limited number of service-users. We plan additional validation with a wider service-user base in the near future. As part of the future work, we intend to refine this quasi-participatory design process in similar organizational contexts as well as in different business domains. In particular, we observe the potential in the Social Impact space, which may be well-disposed due to the tradition of the participatory action research. We observed the possibility of Service Designer playing different roles like team facilitator, mentor, educator, and moderator to build consensus. The different roles the designers could play, that is, 'wearing different hats', and the contribution of appropriately incorporating the roles in the quasi-participatory design approach could be an interesting area of future research.

In spite of its limitations, we hope that this study will serve as a useful point of departure for discussion around quasi-participatory design approach, our suggestions and how to utilize the available tacit knowledge. We see the applicability of this approach in organizational service design as well as in social impact sectors which have similar challenges.

References

- Ajiboye, J. O., & Ajitoni, S. (2008). Effects of Full and Quasi-Participatory Learning Strategies on Nigerian Senior Secondary Students' Environmental Knowledge: Implications for Classroom Practice. *International Journal of Environmental and Science Education*, 3, 58-66.
- Atvur, A., Rau, K., & Wilson, B. (2015, August 31). Making Sense of Service Design with Internal Stakeholders. *Touchpoint Vol 7. No. 2 - In-house Service Design*, pp. 52-54.
- Bauer, T., & Green, S. (1994). Effect of newcomer involvement in work-related activities: a longitudinal study of socialization. *Journal of applied psychology*, 79(2), 211.
- Beyerle, D., & Wend, M. (2015, August 31). From Zero to Hero: E.ON meets service design. *Touchpoint Vol. 7 No. 2*, pp. 66-69.
- Blomkvist, J. (2015). In-House Service Design Roles—A First Look. *LASDR2015 conference-Interplay*, (pp. 201-213). Brisbane, Australia.
- Bowen, S., McSeveny, K., Lockley, E., Wolstenholme, D., Cobb, M., & Dearden, A. (2013). How was it for you? Experiences of participatory design in the UK health service. *CoDesign*, 230-246.
- Campbell, A. (2011). Collaboration is misunderstood and overused. *Harvard Business Review online blog* hbr. Retrieved from http://blogs.hbr.org/cs/2011/09/collaboration_is_misunderstood.html.
- Carstensen, P. H., & Schmidt, K. (1999). Computer supported cooperative work: New challenges to systems design. In *In K. Itoh (Ed.), Handbook of Human Factors*. Citeseer. *Distributed computing*. (n.d.). Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Distributed_computing#CITEREFGodfrey2002
- Ehn, P. (1988). Work-oriented design of computer artifacts. Arbetslivscentrum.
- Fischer, G. (2001). Communities of interest: Learning through the interaction of multiple knowledge systems. *IRIS Conferenæ*, (pp. 1-13). Bergen.

- Fischer, G. (2004). Social creativity: turning barriers into opportunities for collaborative design. *Eighth conference on Participatory design: Artful integration: interweaving media, materials and practices-Volume 1* (pp. 152-161). ACM.
- Fogg, B. J. (2009). A behavior model for persuasive design. *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.
- Godin, D., & Mithra, Z. (2014). Aspects of research through design: a literature review. *Proceedings of DRS*.
- Johansen, R. (1988). Groupware: Computer support for business teams. *The Free Press*.
- Katz, A. (2015, August 31). Seven Stages to a Design-Based Innovation Culture: A guide for in-house design teams. *Touchpoint Vol. 7. No. 2*, pp. 20-25.
- Keller, L. (2014, December 22). *Designing Great Organizational Services*. Retrieved from UXmatters: Service Design Column: <https://www.uxmatters.com/columns/service-design/>
- Kelly, K., & Schaefer, A. (2014). *Creating a Collaborative Organizational Culture*. Retrieved from <http://www.kenan-flagler.unc.edu/>: <http://www.kenan-flagler.unc.edu/~media/Files/documents/executive-development/unc-white-paper-creating-a-collaborative-organizational-culture.pdf>
- Kensing, F., & Blomberg, J. (1998). Participatory design: Issues and concerns. *Computer Supported Cooperative Work (CSCW)*, 167-185.
- Khambete, P. (2013, May). *Designing Desirable Service Experience: A Pattern Language Framework for Designing Touch Point Ecosystems*. Indian Institute of Technology Bombay, Industrial Design Center. Mumbai, India: Indian Institute of Technology Bombay.
- Khambete, P., Athavankar, U., Doke, P., Shinde, R., Roy, D., Devkar, S., & Chaudhary, S. (2015). A Case Study in Participatory Service Design for Rural Healthcare System in India Using a Pattern Language. *ICoRD'15-Research into Design Across Boundaries Volume 1* (pp. 3-13). Springer India.
- Korpela, M., Soriyan, H., Olufokunbi, K., Onayade, A., Davies-Adetugbo, A., & Adesanmi, D. (1998). Community participation in health informatics in Africa: An experiment in tripartite partnership in Ile-Ife, Nigeria. *Computer Supported Cooperative Work (CSCW)*, 339-358.
- Koys, D. J. (2001). The effects of employee satisfaction, organizational citizenship behavior, and turnover on organizational effectiveness: A unit-level, longitudinal study. *Personnel psychology*, 54(1), 101-114.
- live|work. (2016, January). *Trends in Service Design 2016*. Retrieved from live|work monthly magazine: <https://www.liveworkstudio.com/monthly-magazines/trends-in-service-design-2016/>
- Mahamuni, R. H., Khambete, P., & Mokashi Puneekar, R. (2017). Exploring Distributed Cognition as a Conceptual Framework for Service Design. *International Conference on Research into Design* (pp. 959--972). Springer.
- Mahamuni, R., Khambete, P., Mantry, S., Das, U., & Verghese, M. (2016). Participatory Service Design for Reimagining Corporate Services: A Case Study. *20th DMI: Academic Design Management Conference*. Boston.
- Mäkijärvi, T. (2015, August 31). Finding New Growth Opportunities via Customer Centricity: Experiences of in-house service design. *Touchpoint Vol. 7 No. 2*, pp. 30-33.
- Ravi Mahamuni, Shivani Sharma, Sylvan Lobo, Ulemba Hirom, Pramod Khambete
Quasi-participatory service design in organizational context: A case study
Linköping University Electronic Press

Shivani • 1211

- Marlovits, S., Fischl, W., & Mang, T. (2015, August 31). Breaking the Ice with In-house Service Design: Reflections on building one of the first permanent in-house service design units. *Touchpoint Vol. 7 No. 2*, pp. 16-19.
- Mrad, C. G., Vandertuyn, M., & Mahraj, K. (2015, August 31). Enabling a Culture of Innovation: Designers must share the design process. *Touchpoint Vol. 7 No. 2*, pp. 10-13.
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of management*, 23(3), 513-563.
- Sangiorgi, D., & Clark, B. (2004). Toward a participatory design approach to service design. *PDC*, (pp. 148-151).
- Simonsen, J., & Robertson, T. (2012). *Routledge international handbook of participatory design*. Routledge.
- Spinuzzi, C. (2005). The methodology of participatory design. *Technical communication*, 52, 163-174.
- Steen, M., Manschot, M. A., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design 5 (2)*, 53-60.
- Trischler, J., Pervan, S. J., Kelly, S. J., & Scott, D. R. (2017). The value of codesign: The effect of customer involvement in service design teams. *Journal of Service Research*.
- Weiss, J., & Hughes, J. (2005, March). Want collaboration. *Harvard Business Review*, pp. 93-101.

Appendix 6

Concise
Personas
Based on Tacit
Knowledge
- How
Representative
Are They?

India HCI
2018.
Bangalore

Concise Personas Based on Tacit Knowledge - How Representative Are They?

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ABSTRACT

Personas have become integral to the user-centered design process, enabling designers to acquire empathy for the users, and guiding the design. Effective personas need to be representative of the user population. Persona creation based on immersive data collection and integrative analysis is recommended. In practice though, constraints of time, resources and access to end users often result in insufficient data. Augmenting the limited data with tacit knowledge can be effective in persona creation, although the representativeness of such personas must be established. We created concise personas through two action research inspired cycles leveraging tacit knowledge of a cross-functional, multidisciplinary team designing a service for their own organization. The representativeness of these personas was statistically validated using paired comparison method and Kolmogorov–Smirnov test. The approach can be valuable in similar situations for creating valid personas.

Author Keywords

Personas; Concise persona; Persona Validation; Service Design; Organizational Services.

ACM Classification Keywords

H.5.2 Information Interfaces and Presentation: [Theory and methods]

INTRODUCTION

Personas are rich, representative descriptions of goals, behaviors and attitudes of the target user groups. Well-

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developed personas evoke empathy for the users and enable creating successful user-centered solutions. Use of persona is prevalent in practice, despite known limitations based on theoretical and empirical grounds. One of the key challenges that can affect the quality of personas is the practitioners' inability to gather exhaustive rich data.

Organizations design, develop and deploy applications and services for their staff (e.g. Intranet, Human Resources (HR) and Administration services), which need to be well-designed and could use personas. Deep and varied tacit and explicit knowledge about the end-users that various stakeholders possess offers an opportunity to develop quality personas. The significance of tacit knowledge acquired via lived experiences was recognized [8] for providing valuable insights into organizational dynamics, informal structures, and culture.

Tacit knowledge, “a way to know more than we can tell” arises from actions and experiences that take place in specific contexts and operates without “focal” awareness [41]. It is a crucial component of actionable knowledge relevant to business situations [25]. Individuals cumulatively build rich high-quality tacit knowledge through a variety of direct “hands-on” experiences. Multidisciplinary groups collectively apply individuals' tacit knowledge. The aggregate knowledge arises from a continuous “spiral” synthesis of complementary tacit and explicit components, facilitated by Socialization of the experiences in a trusted environment (Empathizing), Externalization (Conceptualizing), Combination (Connecting) and collective Internalization [35].

The motivation for our research was to explore the effectiveness of utilizing the tacit knowledge that stakeholders possess, instead of reliance on extensive primary user studies for creating valid personas. The premise was that if found to be useful, the approach may help to overcome the commonly encountered constraints of time and resources.

We followed a collaborative action research approach to develop personas, using stakeholders' tacit knowledge about the target users in a large IT company. The participants had the lived experience of interacting with a large number of associates in a range of situations over a long period of time. As a single session would be insufficient to uncover tacit knowledge, an iterative, reflective approach inspired by the Action Research paradigm was adopted. The typical action research cycle [08] was adapted and mapped to our objectives and context. Figure 1 highlights the stages of knowledge utilization and associated activities and artefacts. Reflection and discussions for synthesizing the participants' knowledge followed the themes suggested in The Learning Window technique [31]: What do we know? What do we think we know? What do we know that we don't know? Equally relevant for uncovering the tacit knowledge about the users, was the fourth theme: What might be relevant but outside our conscious awareness?

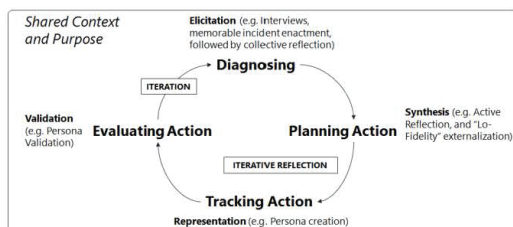


Figure 1. Iterative Persona Development Cycle Using Tacit Knowledge - Adapted from Action Research Cycle [8]

“Active collaboration” in Action Research requires facilitating people differing in knowledge, skills and perspectives who have various roles and responsibilities to work together. The creative exchange among them leads to co-creation of knowledge that can inform the desired outcomes [51]. The participants in our study were from a spectrum of functions in the organization, and shared common organizational goals and ethos. Tacit knowledge is difficult to transfer to another person by means of writing or verbalizing [41]. To facilitate externalisation and exchange of tacit knowledge, devices such as sketching, mood-board-like collages and enactment of memorable incidents pertaining to the end-users were utilised in two cycles of persona creation and validation. The personas were statistically validated for their representativeness of the target group using Paired Comparison and Kolmogorov–Smirnov test (K-S Test). It appears that the approach led to successful creation of representative personas within the constraints of time and resources.

PERSONA EVOLUTION

We present an overview of persona literature to locate the objectives, design, execution and outcomes of the study.

The Concept

The persona construct aligned to user-centered design was introduced by Cooper [9] and popularized in subsequent works by [32,42] and others. Personas are “hypothetical

archetypes” or “composite archetypes” of users [9] [10], created based on data. The need to embed personas in the design process and treating it as a method in its own right was emphasized [32,10]. A persona is not an archetype of the “whole” person, but rather aligned to the aspects relevant for their application. Several complementary personas of stakeholders who play a role as beneficiaries and facilitators might be needed as well. A persona must be detailed enough to bring out the distinctiveness of the group it represents. Literature identified several benefits of Persona, such as [32]: focus on specific users and their needs rather than technology, determining the “right” problems to address, challenging long-held assumptions about the users, eliminating self-referential design, facilitating agreement and supporting design decisions. Evidence of the expected benefits was found across projects of varied size, duration and business domains in an extensive ethnographic study [34]. Management support, the teams' understanding of the application and usefulness of the method, embeddedness in the design process and sustaining through a learning curve, including early failures were facilitating factors. Rich rather than merely extensive data contributes to valid personas.

The Critique

Several research studies, reflections and critiques over time pointed to the lack of empirical evidence of representativeness, the process, and the benefits to practitioners. We examine some of them.

It was argued that the generalizability of a persona diminishes as it becomes more detailed [6,7]. Personas could conflict with other data and designer's “tacit” knowledge about the users. These conclusions are open to challenge though as the cited study focused on “communicativeness”, rather than the holistic use of Personas, arguably the heart of the construct. That ideas that excessive details could hamper effective use of personas, and the need to assess a persona before use were valid. Another study too assessed the benefits of personas as a communication tool [18]. Infrequent use of personas as a communication aid during the design process was noticed, and apparently the design decision was largely opinion driven. On a positive note, the participants did acquire a subtle understanding of the target users while creating the personas. However, as it was a single case study, spanning forty hours of observation of a team of four designers the conclusions might lack ecological validity [46]. As a rebuttal, focus on personas merely as a communication tool was opposed by Nielsen [33].

The claim that personas enable designing “*right product for the right person*” was questioned, arguing that personas can be used to justify design decisions after the fact [45]. The research though was based on three student projects aimed at teaching the method, and not from design practice. However, the personas did enable design in a structured manner. A study of four participatory design projects revealed little evidence of the significant contribution of personas in

participatory design projects, though the use of ad-hoc personas was helpful to an extent [3].

Adequacy of persona descriptions and types has been questioned as well. Bødker and Klokrose [4] argued that personas and scenarios leave a gap, that can be addressed with “techsonas” aimed at visualising action possibilities of the intended technologies. There could be difficulties in integrating personas in the design process as the Interaction Designers might not trust the personas developed by others. Greater involvement of designers in persona creation, incorporating their own knowledge of the users, application of best practices and access to the underlying data was recommended as a remedy [2,20].

Despite the arguments and counterarguments, persistent use of personas in practice, anecdotal evidence and enduring discussion in the research community suggests that persona is a useful tool in design, albeit with limitations. Personas arising from the synthesis of knowledge from a variety of sources, participation of stakeholders and designers in developing them, robust development process and appropriate validation are factors that facilitate their effective use. We examine the practices related to these aspects.

Variations in the Development Process

Though there is no “standard” method to develop personas, there is an agreement that to be effective personas should be based on real data ideally captured through interviews and observations, interpreted by the creators to extract and represent the insights about the users [7]. The value of secondary sources is recognized too. Cooper advocated incorporating data from sources like stakeholders, market research and so forth [10]. The value of “provisional personas”, or “ad-hoc personas” when data availability and time are constraints was acknowledged as well. Norman [36] suggested collaboratively “mining” the designers’ experiences, i.e. leveraging their tacit knowledge about the users. Novice designers may create detailed persona descriptions that may lack in representativeness. A way out is to create an initial set of personas based on customer data analytics, i.e. secondary data [47].

“Static” personas cannot account for the influence of context on the behavioral dynamics. Therefore, engaging with the users through dramatization, enactment and analogous approaches help in eliciting their experiences [38,34,10]. We used a similar approach, i.e. uncovering and externalization of stakeholders’ tacit knowledge through the enactment of scenarios in the life of the target users.

Several organizations follow Agile development processes, in which it would be difficult to elicit insights through extensive field studies, leading to reliance on secondary data and assumptions about users. Assumption Personas [17] are based on tacit knowledge, experiences, and sensitivity to the domain. If the risk of succumbing to preconceived biases is handled well, tacit knowledge is a good source of data for

developing personas [53]. Sound argumentation schemes can provide support to justify the robustness of the personas. For instance, Toulmin’s Model of Argumentation [50] can be used to logically tie together the data, assumptions and limitations to justify the acceptability of such personas as “representative” for the intended application [16]. Pedemonte & Reid [39] suggested the strategy to combine Toulmin’s model with “creative abduction” based on verified data. Abductive reasoning is now accepted as part of designerly activity, and the suggestion seems worth considering.

Market segmentation is a common alternative to Personas in Marketing. Though market segments ‘dehumanize’ users [32], creating several personas in each segment could “bring them to life” [55]. Particularly, market segmentation can be an intermediate step to create more relevant personas [10].

In conclusion, it seems personas built on multiple data sources, namely observation, secondary data, and particularly tacit knowledge using interpretive and abductive reasoning could be effective in several real-life design situations. The key component that needs to be added is their validation before use in the design process.

VALIDATION OF PERSONAS

The decisions in participant selection, data filtering, interpretation and other choices during the user research could have undesirable consequences on the quality of the personas [43]. Reusing inappropriate personas from previous projects is risky too. Erroneous personas could possibly result in irrelevant design decisions and poor user experience.

We need to approach the “validity” construct cautiously. The criteria for validity in the scientific tradition differ from those in qualitative studies which depend on reflexivity of the researcher. It is well accepted in the latter that trustworthiness, authenticity, transferability, plausibility and extensibility (as against generalizability), and credibility are appropriate measures [12]. Continual verification of findings, peer-checks and self-reflection were suggested as ways to ensure validity [30]. Some of the persona validation approaches that echo these ideas were: Grounding in data and argumentation to trace persona characteristics to empirical data [16], Heuristic approaches along with mixed methods of data collection [48], online persona validation frameworks [24] utilizing social media and mass participation, apart from statistical analysis of data as appropriate [28]. Nielsen [33] suggested verification and validation within the persona creation process, through user review and their participation in persona building.

In view of the suggested approaches, we decided to use qualitative and quantitative methods, stakeholder participation in persona creation and validation through the involvement of another set of associates who had not participated in the persona development.

CHALLENGES AND OPPORTUNITIES IN DEVELOPING PERSONAS FOR ORGANIZATIONAL CONTEXT

Design and agile methodologies are often integrated in practice [13]. Approaches like 5-day design sprints [1], one-day design studios [52], design workshops, etc. are gaining ground. Persona development must leverage alternate data sources, to overcome the impracticality of embedding in-depth user research in these approaches.

Persona-based design was used to bridge the differences between interdisciplinary agile development teams [19]. Collaborative creation of personas early-on in a project with iterative refinement was recommended. The stakeholders can then pool and convert their explicit data and tacit knowledge into sharable artefacts, collectively building empathy and common understanding of the users. The approach might be particularly useful to design internal services within an organization as the stakeholders would have internalized tacit knowledge about the users through regular and prolonged interactions with them. The quality of the personas could be ensured if ways are adapted to tackle their biases and designers collaboratively arrive at relevant personas. The advantages of this approach were corroborated in [41]. A key challenge is to ascertain whether the personas are representative enough. Employees of an organization interact with users in a variety of contexts and roles; in formal and informal manner. Often, the interactions have a significant social dimension. Therefore, they are likely to have well-rounded perspectives about users. Such “neutral” staff, who do not participate in persona creation could be roped in to validate the persona representativeness.

Enterprise service systems are multidimensional, complex, intangible, heterogeneous and have a temporal component like any other service systems [21]. Service design of enterprise service systems is therefore gaining popularity. Designing user-centric services requires a deep understanding of service-users and their expectations. It is also important to know the way service-user experience builds up over time through multiple service encounters. The use of personas is likely to give rich dividends in terms of the quality of design outcomes. The challenges discussed previously need to be tackled though. Tacit knowledge based persona development has a potential to fit well in the organisational context, have greater acceptability and help in institutionalising service design processes.

BACKGROUND OF THE DESIGN STUDY

It was decided to develop the personas mainly based on the tacit knowledge of the stakeholders (i.e. members of the service provider function) working in a multidisciplinary team, augmented with data from other sources. The other staff of the organization were to participate in the validation process. This appeared to be the best way to overcome the challenges of the organizational context, which nonetheless presented opportunities to leverage rich tacit knowledge.

This study was part of a service design project for reimagining the employee recruitment and assimilation

system in a large Indian IT Services organization. The “service provider” were the HR and Recruitment functions. The Service Providers wanted to enhance the effectiveness of the existing HR services as well as aim for service innovations. The target service users were new entrants in the experience range of 2.5 to 12 years. It was collectively decided to use a set of iteratively validated personas based on the stakeholders’ and the designers’ (themselves employees) tacit knowledge.

The multidisciplinary design team (MD team) composition was: 2 recruitment team representatives, 2 HR representatives, 2 service users and 3 service designers. The recruitment and HR team members had experience of wide, deep and sustained engagement with service users, in the organization as well as similar organizations. This provided an assurance of a sound tacit knowledgebase. As likelihood of biases was an obvious danger, an external mentor from a reputed design school who had in-depth expertise in service design was invited to participate. The MD team composition mitigated falling into the trap of biases and creation of stereotypical personas. The MD team members had spent 3 to 20 years in the organization and were well-versed with the service user attitudes and behaviors in different contexts – formal as well as informal, the culture and processes. The designers were also part of the same organization and had a comprehensive understanding of service users through self-reflection and knowledge of their colleagues’ behaviors. It was reasonable to assume that the team had in-depth tacit knowledge from multiple perspectives which could be used in arriving at personas.

In order to achieve active and engaged participation, the participants were assured complete confidentiality and anonymity. The spirit of egalitarian, anxiety-free and cohesive participation was maintained throughout, and further nurtured through informal interactions beyond the workshops. Each persona development cycle went through the stages of knowledge as shown in Figure 1. The activities were inspired by participatory action research approach.

CYCLE 1: DETAILED PERSONA CREATION AND VALIDATION

The objective of the cycle was to find representativeness of the detailed personas primarily built on the tacit knowledge of the MD team members. The cycle comprised three full-day workshops with all key stakeholders over a span of one month to externalize the tacit knowledge. The stages in the cycle were:

Tacit Knowledge Elicitation: Workshops, discussions, interviews, enactments, Seed Customer Journey Maps, sketching, picture collage; **Synthesis:** Low fidelity personas, annotations, cycles of reflections by key stakeholders (creators of personas), Plan for detailed personas; **Representation:** Detailed Personas; **Validation:** Reflection and validation by key stakeholders (persona creators), Identified the gaps and lacunas.

Various techniques such as writing, narration and enactments of critical incidents, stimulating discussion through seed artefacts, sketching and metaphor elicitation through collages of photos from print and digital media were used to uncover the tacit knowledge (Figure 2). The seed artefacts such as partially filled Customer Journey Map (CJM), Low-fidelity persona sketches and partial service blueprints were very effective in engaging the key stakeholders and externalizing the tacit knowledge. The CJM and Service Blueprints aided recall of critical incidents and their details.



Figure 2. Tacit Knowledge Externalization: Evocative photos and enactments of critical incidents

The techniques of encouraging non-designer team members to sketch, overcoming the apprehensions about their abilities and asking them to identify evocative photos from media enhanced their interest and motivation. It also helped to externalize the subtle and varied aspects about the users, context and service situations. The collective reflection on the in-process artefacts helped the key stakeholders to build on each other's knowledge leading to a holistic perspective.

The persona depiction and reflection proceeded in an iterative manner to encourage the "Spiral" mode [35] referred earlier. To avoid "writer's block" conditions, the team created the first persona with the "seed" coming from one real but anonymous user from each user type under consideration that the team members knew. The team then compared the variations in the characteristics with other people belonging to the same user type. Through a process of additions, deletions and modifications, the MD team synthesized the final personas. The MD team developed four such personas through multiple iterative cycles. At the end of three full-day workshops, the personas had been iteratively refined and were ready for validation. The personas were described in detail. It was suggested that shared artefacts play a role in supporting each other's thought process in multidisciplinary setting [27]. The technique of MD team jointly reflecting on the in-process personas as they narrated and role-played real-life stories was found to be significantly effective in externalizing and synthesizing the tacit knowledge. It also helped to question the biases and in reaching a consensus on the key behavioral, attitudinal and contextual aspects. The external mentor acted as an active observer ensuring that biases were not creeping in and provided "nudges" to move away from stereotypes.

In-depth user research for such a large organization was not feasible in the available time and resources, and for operational reasons. The four personas were therefore further

refined with inputs from interviews of nine service users recruited using convenience sampling.

Validation through reflection

The team printed the personas as A0 size posters for ease of reference. Each team member then independently assigned a "degree of prevalence", i.e. the proportion of the target users that belong to the type represented by the persona. The MD Team members answered the question "what is the percentage of the people I encounter in the organization that are similar to each persona?". They were encouraged to avoid "ties" as far as possible. No ranking was forced. They were also asked to point out gaps and the need for additional personas (the "Residual" category in Table 1). The objective of this validation exercise was to understand the relative ranking of the identified personas and identify missing personas, if any. Indirectly, it was expected to reveal whether the persona depiction indeed conveyed the key attributes of the user types, and that the entire end-user population was covered.

The following main observations were noted:

- Participants faced difficulty in expressing the degree of prevalence as a percentage value.
- Participants had the notion of "user segments" in mind, aligned to roles in the organization, typically strongly associating them to age. As a result, they had difficulty in visualizing the prevalence of overlapping persona attributes across the "user segments" (e.g. life aspirations and contextual aspects). This led to difficulties in deciding the degree of prevalence.
- In three out of nine responses, the total of percentages deviated from 100%. It was expressed by some participants that they "somehow fitted" the personas in 100% despite the freedom to indicate missing personas. The observation was interpreted as indicative of the missing representation of some user type(s).
- It was difficult for the participants to retain in mind the details of all the personas while deciding the degree of prevalence in spite of their active role in persona creation process. They spent on an average 6-7 minutes referring to the persona posters to re-absorb the information. The difficulty could be due to the extent of details in the persona descriptions. Similar issues were noted in [7].
- The procedure of each participant independently assigning the degree of prevalence introduced a level of objectivity. Consciously thinking about the degree or prevalence led them to reflect on their preconceived notions about the target user groups.

There was no consensus on the ranking in terms of degree of prevalence (Table 1). This was a surprise to the participants themselves as they had actively participated in creating the personas. It is likely that the procedure adopted led to diminishing the "groupthink" effect. This might as well mean that the personas overlap in reality, or that some of the

user types are indeed close in numbers as reflected in the close ranking of the top three personas. Some of the variations could be attributed to the kind of people the participants encounter in their own smaller spheres. This points to the need of an adequate number of participants, with varied work settings as raters. Three of nine members indirectly indicated that the personas did not cater to some types of end-users. In conclusion, the following needs emerged for addressing in the next cycle.

- Segmentation as initial basis for developing the personas to account for variations in life situations and contexts. This is an idea similar to stratified sampling.
- More number of personas in each segment to encompass variations in behavioral and attitudinal attributes.
- Concise, less detailed persona description and depiction.
- Reduction of the cognitive load in comparing the personas for determining the degree of prevalence.
- Ways to determine the degree of prevalence without assigning percentages

%	r1	r2	r3	r4	r5	r6	r7	r8	r9
Deepika	30	33	29	20	20	20	35	21	13
Vikas	15	17	15	10	27	25	30	36	29
Abha	35	39	48	68	13	25	22	33	14
Anvay	5	11	8	2	40	10	13	10	6
Residual	15	0	0	0	0	20	0	0	38

Table 1. Detailed Personas: “degree of prevalence” data

Planning the next cycle

To address the needs that emerged from cycle 1, it was decided to create concise personas, several in each known segment of users in the organization. The method of paired comparisons [11,14] was used to determine relative degree of prevalence. In this method, the participant is invited to indicate their preference between two “objects” at a time, vis-à-vis the attributes that are to be judged subjectively. The method reduces cognitive load and enhances the ability to subjectively discriminate among similar stimuli. Further, it was likely that the differences between personas would be subtle. We also decided that the participants in the ranking exercise would be others in the organization who were not involved in the persona creation process but would have varied and rich interactions with the user types represented by the personas.

CYCLE 2: CONCISE PERSONA CREATION AND VALIDATION

The objective was to find the effectiveness of the concise personas built using the MD team members’ tacit knowledge. Concise personas were created for each identified service user segment. As the first step, the MD team collaboratively arrived at various attributes that could differentiate the service users—e.g. demographics, life priorities, marital status, attitude, behavior, background,

experience, relocation, expectations from life, career aspirations, working style, skills, job switching frequency, etc. These various attributes were used for creating the service user segments as suggested by Cooper and others [16]. They were also used in developing early personas in line with ad-hoc personas by Norman [36] and others. The team arrived at the following two service user (employee) segments for an experience range of 2.5 to 12 years through multiple iterative cycles based on key differentiating attributes i.e. age and life priorities [37,40]:

Segment-1 (Age group 25 to 28 years): This segment comprises employees with 2 to 3 years of professional experience. They may not have onerous financial responsibilities and exhibit independence. A small number of them might be married.

Segment-2 (Age group 29 to 35 years): Such employees are likely to have a lifestyle consistent with married life and age (e.g. young kids, family responsibilities and dependent parents—a common occurrence in Indian culture). They may have higher expenses and financial liabilities, such as housing and vehicle loans. They may have started playing early leadership, mentoring, or senior roles in their teams.

Usefulness of tacit knowledge to develop personas is already discussed in earlier sections [36,17], and seemed to be confirmed in Cycle 1 of our study. Therefore, the MD team adopted an approach similar to that in Cycle 1 to create personas corresponding to each of the segment. The team used the differentiating attributes identified earlier to arrive at few basic early personas which were distinct and identifiable. In each segment, the team created the first “seed” persona keeping in mind one or two ‘real’ but anonymous users. The variations in the earlier identified characteristics were compared to either enhance the same persona or create a new persona. At the end of this collaborative reflection driven iterative process, the team arrived at five distinct personas per segment. Figure 3 is a sample of a concise persona.

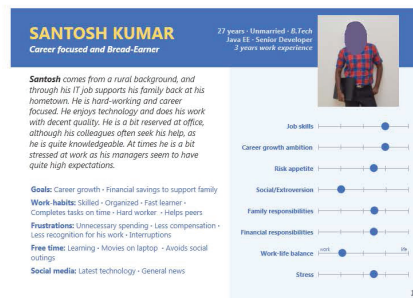


Figure 3. Sample concise persona

Validation of concise personas

As in the previous cycle, the main objectives for this validation exercise was to understand the degree of

prevalence of the personas, and identify the missing personas, if any. Concise personas served as the reference.

First, the MD team elicited independent comments from five appropriate employees who were not involved in the persona development, to qualitatively assess the persona’s representativeness. The employees had over three years of experience in the organization and had regular interactions with a wide variety of employees in different contexts. The questions asked were of the kind: “Does the description bring to mind some employee/s?”, “If not, what might be missing in the description?”, and “Do any kind of employees come to mind who have significantly different behaviors and attitudes”. It was concluded that the concise persona descriptions were good enough to represent the cross-section of employees. Some of the concise personas descriptions were refined using their feedback. The refined persona descriptions were converted into A5 size cards for ease of reference and comparison.

	Santosh (Sa)	Deepak (De)	Nikita (Ni)	Rahul (Ra)	Nitin (Nt)	Total (To)
Sa		9	6	8	9	32
De	4		5	8	9	26
Ni	7	8		9	10	34
Ra	5	5	4		10	24
Nt	4	4	3	3		14
To						130

Table 2. Concise Personas: Segment 1 – Relative ranking

	Exp. Freq.	Obs. Freq.	Cumm. Obs. Freq.	Cumm. Exp. Prop.	Cumm. Obs. Prop.	Diff.
Santosh	26	32	32	0.20	0.246	0.046
Deepak	26	26	58	0.40	0.446	0.046
Nikita	26	34	92	0.60	0.708	0.108
Rahul	26	24	116	0.80	0.892	0.092
Nitin	26	14	130	1.00	1.000	0.000

Table 3. Concise Personas: Segment 1 – K-S Test results

The next step was Paired Comparison. The MD Team showed each respondent two cards of personas from the same segment and asked: “Which type of people among these two you see more prevalent in the organization?”. Respondent indicated relative prevalence by selecting one card of the personas. No “Tie” was permitted. Respondents were permitted to revisit a pair at the end, if they were unable to decide right away. The team noted the pairs where respondents faced difficulty in judging prevalence. They were also asked to point out gaps and need of additional personas.

Personas across the segments were not compared, due to the potential incompatibility of descriptions across the segments observed in Cycle 1. The MD team also captured the segment each respondent belonged to, for future analysis.

13 respondents validated Segment 1 personas, and 12 respondents validated Segment 2 personas. All participants had an IT industry experience ranging from 3 to 25 years.

Table 2 and Table 4 indicate relative rankings for both segments. The Santosh-Deepak cell (row1, column2), shows that 9 respondents felt Santosh was more prevalent than Deepak, while the remaining 4 thought the reverse, as shown in the cell Deepak-Santosh (row2, column1). From Table 2, it is clear that in segment 1, the persona “Nikita” was more prevalent, followed by “Santosh” and “Deepak”.

The persona ranking was statistically validated using Kolmogorov–Smirnov test (K–S test), which is non-parametric and distribution free [23]. The test provides two-tailed significance, which was adequate for our purpose. Further, generalizability which is a common objective in quantitative research was not the aim. The services were to be designed for the entire organization, and the intent was to provide adequate confidence to determine the primary and secondary personas in informing the design process. In situations where replicability is not an aim, it was recommended that the effect size, or “effect magnitude” should be taken into account [49,22]. While interpreting effects, credibility and robustness should be given due importance [54]. The noticeable effect size (i.e. the clear distinction that emerged in the ranking) noticed in systematic use of well-established method was therefore taken into account. Assessment of “Practical Significance” which denotes “a large enough effect to be important in practice” [15] does not call for a very large confidence interval, particularly in case of small sample size [5]. In view of these recommendations, confidence interval of 85% to 90% was adequate for our purpose. The null hypotheses, $H_0 =$ ‘no difference in the relative prevalence of personas in the organization’ was tested accordingly. In Table 3 and Table 5, *cumm* means cumulative, *obs* means observations, *prop* means proportion and *diff* means difference. The maximum different 0.108 was tested with D value of 0.107, which was significant at 90% confidence level. Therefore, the null hypotheses of ‘no difference in the relative prevalence of personas in segment-1’ stood rejected.

It was clear, as in Table 4, that the persona “Aditya” is more representative followed by “Anurag” and “Abha” in Segment 2. The maximum different 0.106 was tested using K-S test, and at D value of 0.107, it was marginally not significant at 90% confidence level, but was significant at 85% with D value of 0.105. Therefore, the null hypotheses of ‘no difference in the relative prevalence of personas in segment-2’ stood rejected. Since the purpose of personas is to assist the design process, 85% confidence level of their prevalence is acceptable considering the “effect magnitude” and “practical significance” as discussed earlier. For both the

the design process and design outcome need to be investigated further as well.

CONCLUSION

This study presented a process of creating and validating concise personas created using tacit knowledge. The adequacy of the concise depiction and validity in terms of representing the target user groups was established. A prerequisite seems to be access to tacit knowledge arising from deep, sustained engagement with a wide spectrum of end-users. The benefits of in-depth user studies, and rich data collection is not discounted. Depending on the availability of time and resources, refinement of concise personas through additional data is desirable. However, greater reliance on high-quality tacit knowledge about the users can speed up creation and meaningful application of personas. Further, the concise persona validation may highlight the gaps in knowledge about the users and help to decide additional data needs and gaps that could be addressed iteratively.

Personas are commonly used in design projects. We see the applicability of the proposed tacit knowledge externalization methods as well as concise personas and its validation methods in practice. Practitioners could adapt these to their own context to create valid personas. There could be further research in strengthening the knowledge outcomes of this study. In particular, it would be worthwhile to research the extent to which the concise personas affect, positively and negatively, the design process and outcomes.

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REFERENCES

1. Richard Banfield, C. Todd Lombardo, and Trace Wax. 2015. *Design Sprint: A Practical Guidebook for Building Great Digital Products*. O'Reilly Media
2. Åsa Blomquist and Mattias Arvola. 2002. Personas in action: ethnography in an interaction design team., ACM, 197--200.
3. Susanne Bødker, Ellen Christiansen, Tom Nyvang, and Pär-Ola Zander. 2012. Personas, people and participation: challenges from the trenches of local government. In *Proceedings of Proceedings of the 12th Participatory Design Conference: Research Papers- Volume 1*, ACM, 91-100.
4. Susanne Bødker and Clemens Nylandsted Klokmose. 2013. From persona to techsona. In *Proceedings of IFIP Conference on Human-Computer Interaction*, Springer, 342-349.
5. Ronald Carver. 1978. The Case Against Statistical Significance Testing. *Harvard Educational Review*, 48, 3, 378-399.
6. Christopher N. Chapman, Edwin Love, Russell P. Milham, Paul Eirif, and James L. Alford. 2008. Quantitative evaluation of personas as information. In *Proceedings of Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, SAGE, 1107-1111.
7. Christopher N Chapman and Russell P Milham. 2006. The Personas' New Clothes: Methodological and Practical Arguments against a Popular Method. In *Proceedings of Human Factors and Ergonomics Society Annual Meeting*, 634-636.
8. David Coghlan and Teresa Brannick. 2005. *Doing Action Research in Your Own Organization*. Sage Publishers
9. Alan Cooper. 1999. *The Inmates are running the asylum: Why High-tech products drive us crazy and how to restore the sanity*.
10. Alan Cooper, Robert Reimann, David Cronin, and Christopher Noessel. 2014. *About Face: The Essentials of Interaction Design*. John Wiley & Sons, Inc.
11. Donald R. Cooper and Pamela S. Schindler. 2013. *Business research methods*. McGraw-Hill
12. John W. Creswell. 2007. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Sage Publishers
13. Tiago Silva Da Silva, Angela Martin, Frank Maurer, and Milene Silveira. 2011. User-centered design and agile methods: a systematic review. In *Proceedings of Agile Conference (AGILE)*, 77-86.
14. Herbert Aron David. 1963. *The method of paired comparisons*. London
15. S. M. Ellis and H. S. Steyn. 2003. Practical significance (effect sizes) versus or in combination with statistical significance (p-values): Research note. *Management Dynamics: Journal of the Southern African Institute for Management Scientists*, 12, 4, 51-53.
16. Shamal Faily and Ivan Flechais. 2011. Persona cases: a technique for grounding personas. In *Proceedings of SIGCHI Conference on Human Factors in Computing Systems*, ACM, 2267-2270.
17. Shamal Faily and Flechais Ivan. The Secret Lives of Assumptions: Developing and Refining Assumption Personas for Secure System Design. 2010. In *HCSE*. Springer, 111--118.
18. Erin Friess. 2012. Personas and decision making in the design process: an ethnographic case study. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 1209-1218.
19. Jukka Haikara. 2007. Usability in agile software development: extending the interaction design process with personas approach. In *Proceedings of Agile processes in software engineering and extreme programming*, 153-156.
20. Tharon W. Howard. 2015. Are Personas Really Usable? *Communication Design Quarterly*, 3, 2.
21. L. Kimbell. 2011. Designing for service as one way of designing services. *International Journal of Design*, 5.
22. Roger E Kirk. 1996. Practical significance: A concept whose time has come. *Educational and psychological measurement*, 56, 5, 746-759.

23. Norman R Kurtz. 1985. *Introduction to Social Statistics International Student Edition*. McGraw-Hill Companies
24. Kenneth M. Landis, Jennifer Steinmann, Arun Kumar Prasad, and Caroline Buchanan Hribar. Systems and methods for providing and commercially exploiting online persona validation. U.S. Patent 3,050,870, Filed May 05, 2011.
25. Dorothy A. Leonard and Sylvia Sensiper. The Role of Tacit Knowledge in Group Innovation. 2011. In *Managing Knowledge Assets, Creativity and Innovation*, 301-323.
26. R. Mahamuni, P. Khambete, S. Mantry, U. Das, and M. Verghese. 2016. Participatory Service Design for Reimagining Corporate Services.
27. Ravi H Mahamuni, Pramod Khambete, and Ravi Mokashi Puneekar. 2017. Exploring Distributed Cognition as a Conceptual Framework for Service Design. In *Proceedings of International Conference on Research into Design*, Springer, 959--972.
28. Jennifer Jen McGinn and Nalini Kotamraju. 2008. Data-driven persona development. In *Proceedings of SIGCHI Conference on Human Factors in Computing Systems*, ACM, 1521-1524.
29. Tomasz Miaskiewicz and Kenneth A. Kozar. 2011. Personas and user-centered design: How can personas benefit product design processes. *Design Studies*, 32, 5, 417-430.
30. Peter Miller. Validity. 2008. In Given, Lisa M., ed., *The Sage Encyclopedia of Qualitative Research Methods*. SAGE Publications, Inc., Thousand Oaks, 909.
31. Aiki Nicolaides. Learning Window. 2014. In Coghlan, David and Brydon-Miller, Mary, eds., *The SAGE Encyclopedia of Action Research*. Sage Publishing, CA, 498-499.
32. Lene Nielsen. 2013. *Personas - User Focused Design*. Springer-Verlag
33. Lene Nielsen. 2007. Personas-communication or process. In *Proceedings of Seventh Danish HCI Research Symposium*, 25.
34. Lene Nielsen and Kira Storgaard Hansen. 2014. Personas is applicable: a study on the use of personas in Denmark. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 1665-1674.
35. Ikujiro Nonaka. 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5, 1, 14-37.
36. Donald A. Norman. Ad-Hoc Personas & Empathetic Focus. Retrieved June 16, 2017 from http://www.jnd.org/dn.mss/adhoc_personas_em.html
37. H. Ohja and Meena Pramanick. 2009. Effects of age on intensity and priority of life needs. *Journal of the Indian Academy of Applied Psychology*, 35, 131-136.
38. Jung-Mi Park and Kun-Pyo Lee. 2012. Engaging the User's Memory of Experiences in Design. *Bulletin of Japanese Society for the Science of Design*, 59, 2, 4 29-4 38.
39. Bettina Pedemonte and David Reid. 2011. The role of abduction in proving processes. *Educational studies in mathematics*, 76, 3, 281-303.
40. Pew Research Center. 2010. Millennials. A Portrait of Generation Next. Confi.
41. Michael Polanyi. 2009 (1966). *The Tacit Dimension*. The University of Chicago Press
42. John Pruitt and Jonathan Grudin. 2003. Personas: practice and theory. In *Proceedings of Designing for user experiences*, 1-15.
43. 1978. The Case Against Statistical Significance Testing. *Harvard Educational Review*, 48, 3, 378-399.
44. Kari Rönkkö. 2005. An Empirical Study Demonstrating How Different Design Constraints, Project Organization and Contexts Limited the Utility of Personas. In *Proceedings of HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on System Sciences*, IEEE, 189-209.
45. Mark A. Schmuckler. 2001. What is ecological validity? A dimensional analysis. *Infancy*, 2, 4, 419-436.
46. Rashmi Sinha. 2003. Persona development for information-rich domains. In *Proceedings of CHI'03 extended abstracts on human factors in computing systems*, ACM, 830-831.
47. Volker Thoma and Bryn Williams. 2009. Developing and validating personas in e-commerce: A heuristic approach. In *Proceedings of Human-Computer Interaction-INTERACT*, Springer, 524-527.
48. Bruce Thompson. 1996. Research news and comment: AERA editorial policies regarding statistical significance testing: three suggested reforms. *Educational Researcher*, 25, 2, 26-30.
49. Stephene E. Toulmin. 1958. *The Uses of Argument*. Cambridge University Press
50. Andrew Townsend. Collaborative Action Research. 2014. In Coghlan, David and Brydon-Miller, Mary, eds., *The SAGE Encyclopedia of Action Research*. Sage Publishing, CA, 116-119.
51. J. Ungar. 2008. The Design Studio: Interface Design for Agile Teams. In *Proceedings of Agile 2008 Conference*, 519-524.
52. Gabriela Viana and Jean-Marc Robert. 2016. The practitioners' points of view on the creation and use of personas for user interface design. In *Proceedings of International Conference on Human-Computer Interaction*, Springer International, 233-244.
53. Leland Wilkinson. 1999. Statistical methods in psychology journals: Guidelines and explanations. *American psychologist*, 54, 8, 594.
54. Ian Williams. Personas vs. Segments - What's the Story? Retrieved May 13, 2017 from <https://www.meltwater.com/blog/personas-vs-segments-whats-the-story/>

Appendix 7

Products and
Services –
Strangers
or Siamese
Twins?

ICoRD 19,
Bangalore

Chapter 7 Products and Services—Strangers or Siamese Twins?



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Abstract Services are becoming complex with ever-shifting customer expectations and technological advancements. Consumers are moving away from the liability of owning a solution to fulfilling needs through contractual access to the benefits of a solution. Sharing economy and newer business models such as service platforms exemplified by the popularity of Uber and Rentomojo are becoming more common. Hence, products must incorporate features, modes of interactions, and technological elements that will provide rightful access to the benefits. In view of the dynamics between products and services, it is necessary to investigate which characteristics individually and together that make product service systems desirable and memorable for the users. Through existing literature, we came up with an exhaustive list of the service and product characteristics. Later using two case studies, we mapped these characteristics to prepare a comparison. We suggest answers to questions such as “Is only the intangibility of services a primary differentiator to products?” and “What product characteristics can be realized through services?”

7.1 Introduction

The aim of a product is to fulfill a need satisfactorily. Consumers associate themselves with products through a number of characteristics that define the product. With growing technology, connectivity, and awareness about environ-

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mental impact, there is a changing trend in the idea of ownership of products. Consumers are moving away from the liability of owning a solution to fulfilling the needs through the contractual access to the benefits of a solution. They seek means for avoiding investment in products, yet fulfilling their need with an enhanced pleasurable experience. It implies that to meet consumer needs with enhanced experience, products must incorporate features, modes of interactions, and technological elements that would provide rightful access to the benefits. With a change in the consumption dynamics and consumer patterns, there is a need to define the characteristics for service design against those of product design.

Snelders and Secomandi [1] inform that designers believe services should be fundamentally different from products, since the latter is tangible, whereas the former is an intangible process. They also note that services are usually backed by technology, which is a tangible element in the process. While researchers are trying to identify the key differentiating characteristics between products and services, there is a need to understand whether the two domains are really different or are they complement each other in their existence. The important question is can there be characteristics that differentiate them? Mapping product characteristics against service characteristics can enable designers to identify attributes which connect consumers to products and apply them to the respective “services” being designed. This paper tries to contribute to this effort by identifying the key differentiating characteristics between product design and service design using Research Through Design (RTD) methodology in two case studies: (1) mapping characteristics by replacing a product with a service, (2) mapping characteristics by replacing a service with a product, through a low-fidelity prototype.

7.2 Methodology

The methodology used to carry out this research is described below:

1. Establish the characteristics of product and service as defined in the various literature. The objective of the literature review was to understand the bank of experiences that practitioners in the design field have tried to frame that may guide researchers. Moreover, it will be useful to understand the previous work and potential areas of research, to learn how others have defined and measured key concepts, to develop alternative research projects, to put one’s work in perspective. Literature in marketing and service design domains were studied.
2. Abstract the characteristics by understanding the purpose of a particular characteristic of the product/service and then grouping followed by labeling the ones that fall under the same understanding.
3. Using RTD methodology in two case studies: (1) to map the characteristics of the product to the newly designed service, replacing it, (2) to map the characteristics of the service to the newly designed product, replacing it. RTD is an approach to acquire new knowledge through design practice to build a better understanding of complex and future-oriented issues in the design field [2].

7.3 Establishing Product and Service Characteristics

Earlier research has already defined certain characteristics of products and services. Through the literature review, we compiled product characteristics that define a product such as *form, functionality, feel, aesthetics, appeal, perceived affordance, material, life, environment friendliness, variants, value, durability, reliability, packaging, quality, standardization, affordability, fabricability, maintainability, safety, marketability, installability, and features*. However, taking into account that products and services exist in two different contexts, directly mapping the characteristics from product to service is not possible, and hence a certain abstraction is required. Initially, we categorized all the characteristics using their logical associations with each other. This was accomplished through the affinity diagram technique. Affinity diagram technique is a process used to organize the qualitative data such as observations and insights from research into groups, keeping design teams grounded in the data [3]. It is an inductive approach, which starts from the bottom with the clustering of specific, small details into groups and ends up with general and overarching themes [4]. After a series of affinity mapping with different perspectives, a clear grouping of the characteristics with certain belongingness was prepared. The broad level characteristics which were identified through this exercise are *manufacturability, perception builder, sustained use, safe environment, perceived value, perceived affordance, realized value, and quality*. The labeling used in abstracted groupings was purely proposed by researchers based on their understanding of the contribution of the characteristics in the service creation and usage. Table 7.1 lists the product characteristics with their abstracted characteristics. Service characteristics were similarly established from literature and

Table 7.1 Product characteristics

	Specific characteristics	Contribution/understanding	Abstracted characteristics	Source
1	Packagability, fabricability	Productionability, manufacturability	Manufacturability	[5, 6]
2	Form, feel, aesthetics, material, appeal, variants	From emotional arousal, first look attachment/detachment	Tangible	[6, 7]
3	Maintainability, installability	Customer retention, extended care, anxiety calmer	Sustained use	[6]
4	Environment friendly, safety for use and repair	Harmlessness, wellness, concerning	Safe environment	[6]
5	Value, marketability	Financial returns centric, acceptability	Perceived value	[5, 6]
6	Perceived affordance	Perceived usability	Perceived affordance	[8, 9]
7	Functionality, features	Core use, functionality	Realized value	[6]
8	Quality, life, durability, reliability	Quality, durability	Quality	[5, 6]

Table 7.2 Service characteristics

	Service characteristics	Understanding	Abstraction	Source
1	Standardization, routineness, encounterability	The service encounters, their standard methods, and routineness help in realizing the value of the service	Realized value	[10–12]
2	Complexity, flexibility, granularity, expandability, modularity, inseparability	The service just like an atom is a whole and as molecule is a whole too	Elementalability	[13–17]
3	Transactionability	Builds a perception about the service	Perceived value	[10, 11, 17]
4	Quality	Reliability, empathy, responsiveness, assurance	Quality	[13, 17]
5	Evolutionability	Services need to be upgraded with time	Upgradability	[17]
6	Service presentability	The actionable nature of service and non-tangible nature of service requires to be presented	Presentability	[13, 17, 18]
7	Intangibility	No physical presence	Intangibility	[13, 17]
8	Heterogeneity, perishability	The one-time of its kind	Exclusivity	[13, 17]

abstracted. The list of service characteristics that provide an unforgettable experience to the customer, inferred through the literature review is represented in Table 7.2.

7.4 Case Study 1: Designing a Service for an Existing Product

A product, for which there is no existing service, was selected and a new service was designed to replace it. The selection process of the product was creatively and analytically done, to be meaningful. Trends in consumer behavior, technology, what people like to watch, and so on, were analyzed. These trends identified behaviors that guided in defining the broader “needs” of a person with the respective human behaviors. The products that are available in the market and are catering to these needs were identified. The listed products were filtered with respect to the availability of services for fulfilling the need. The products were then filtered for their adherence to the product characteristics defined initially. The products that are not catering to all the characteristics were further filtered. From the remaining, products that could be quickly and easily implemented without much

investment were selected. Finally, only three products were left for which all the challenges associated with designing a service were narrowed down. These challenges were discussed and by intuitive interest and experiential selection, a product was selected to be transitioned into a service. The product selected was a locker or safety drawer that people use to store and protect valuables. A design brief was created to understand the main purpose of the product. The initial brief was to design a service to keep personal belongings safe.

The next step was to make a user research plan to understand the user behavior with respect to product usage, their needs, and problems faced while using the existing product. The purpose of this study was to understand the domain of safekeeping of valuables, the common practices followed, the direction in which innovation is headed by market players, government norms, and so on. In all, four techniques were employed to collect insights, namely—Domain Research, User Research, Metaphor Elicitation, and Participatory Activity. Domain research started immediately after coming up with the first brief. Case studies available online, news articles, talks, recorded interviews, bank websites, government websites, and RBI guidelines were read thoroughly to understand the domain and its working at the meta-level. After a preliminary understanding of the domain, the user group was identified. Variables on which population under consideration varies were stated and the different types of users were narrowed down. The next step was to start with a User Research Survey, to understand the size of the user group, their quantified need, inclinations, and so on. The researchers conducted a survey through an online platform. It was executed in three languages, namely, English, Hindi, and Marathi, catering to varied user groups. Due to restricted use of the Internet and mobile facilities within a certain user group, in-person surveys were also conducted for a few participants. A total of 80 users participated. The responses were synthesized and illustrated graphically to effectively visualize the user groups.

Post survey, interviews were conducted by the researchers to understand their motivation, thought process, how they look at and take care of their needs, what their actual needs are, and the core of the problem. Semi-structured interviews were conducted across the user groups at their locations. Due to a diversity of culture in India, varied habits and behaviors exist in the society. To understand the behavioral and the cultural context, online interviews were conducted through Skype across the country, and also through personal interviews with varied user groups, wherever accessible. Various stakeholders such as bank staff, ATM managers, private locker facility providers, and police personnel in the system, across different contexts, participated. The Zaltman Metaphor Elicitation Technique (ZMET) was also used, which is a method famous for its depth of understanding of the true need or preferences of the user. It uses metaphorical connections to divulge unspoken needs which are consciously not revealed during usual discussions or enquiry due to human nature. Total 80 images of banks were created and the users were asked to select any five images that they associated with the safekeeping of valuables. The users' replies were analyzed and user requirement themes were revealed for designing the new service. Another qualitative research methodology called participatory activity was also conducted with a different set of users. This approach

aimed to give “the creators chair” to the user and facilitate them to create a solution of their own. This method helps us to understand the hierarchy of preferences and the other factors expected by the users. The research insights were analyzed and synthesized to create user journey maps, ecosystem mapping, emotional map, motivational map, user personas, user scenarios, and critical incidents mapping. Service design being a multidisciplinary participatory activity has team members from varied fields. In order to keep the insights and domain constantly at the back of the mind, there was a need to externalize the ecosystem, user personas, research findings, and critical incidents. Representational posters were created to externalize and visualize the outcomes. The design brief was redefined based on the user research as *“To design a service to safeguard customers’ personal belongings which have a monetary and emotional value with an uncompromising security and connectivity for accessing the facility as and when required by them.”*

The next step was to ideate and to create a new service that attempts to take care of all the insights received from the research and aligns with the brief. A plethora of ideas was generated, some being different variations of the same concept and some entirely new concepts. The feasible ideas were grouped together and a service flow was designed considering the existing bank locker facility. A new service was designed to replace the personal lockers or storage places to keep valuables. Consequently, low-fidelity prototyping was done to get user feedback. The insights received from the users were incorporated in the iterated service design after understanding the limitations. Based on the iterated service design after user feedback, a service blueprint was prepared.

Later as part of the RTD methodology, the new service design was synthesized to check for mapping of product characteristics to service characteristics. The characteristics of the previous product, as taken in the case study, were mapped against that of the newly designed service.

7.5 Case Study 2: Designing a Product for an Existing Service

A number of services, for which no products exist, were taken into consideration. After a strategic selection process, the service for disposing of domestic waste was taken to be replaced by a product. The initial brief stated for the project was *“To design a product that will completely dispose of the garbage generated at homes.”* The secondary and primary researches were done to understand the ecosystem surrounding the present solid waste management system. After understanding the challenges, the constraints around the entire system of solid waste management were framed. It was followed by user research by interviewing six users and understanding their corresponding behavior. Based on the inputs received, the

design brief was re-designed as “*To design a product that will be used to collect waste and will be portable enough for an elderly person to lift and invert. The product will be placed indoors and should either segregate waste by itself, destroy the waste, or convert the waste into some usable product. The cost price of the product should not exceed INR 300*”.

Based on the brief, the ideation phase was followed by the selection phase, and products were ideated to replace the existing service. Three different levels of intervention were proposed and analyzed. A product idea was selected in the later stages of the design process by giving equal importance to logical reasoning and intuitive inclination. Later as part of RTD methodology, the new product design was synthesized to check for mapping of product characteristics to service characteristics. The characteristics of the previous service as taken in this case study were mapped against that of the new product design.

7.6 Observations

A close analysis of the service design from product design gave an understanding that due to the complex nature of services, being interconnected and interdependent, and whose components are dynamic in nature, almost all the attributes of product design like *Manufacturability, Tangibility, Sustained Use, Safe Environmental Impact, Perceived value, Realized value, and Quality* got mapped to their respective characteristics in service as shown in Table 7.3. However, the product characteristic “*Perceived affordance*” was found to be the only component that could not be mapped to service characteristics due to the linear functionality of the service. The conversion or transition of a service to a product gave a different understanding of the nature of service design. The type of product that is designed gave a different mapping outcome:

Table 7.3 Mapping of characteristics of a product to that of its service

Product characteristics of “Safe lockers”	Service characteristics of the new service designed	Source
Manufacturability	Presentability	RTD case study
Tangibility	Realized value	RTD case study
Sustained use	Upgradability	RTD case study
Safe environment	Presentability	RTD case study
Perceived value	Perceived value	RTD case study
Perceived affordance	–	–
Realized value	Realized value	RTD case study
Quality	Perceived value	RTD case study

1. **Product design with complete automation:** The new garbage bin design with complete automation, where it segregates the waste on its own, could have solved the problem but this product alone could not address the need entirely. For the disposal of leftover and unprocessed garbage, a separate service will be required. In this design intervention, the characteristics that got mapped are given in Table 7.4. As shown in Table 7.4, only the service characteristics, namely, Realized Value, Perceived Value, Quality, and Presentability could be mapped with the given solution of product design.
2. **Product design with partial automation:** In order to bring human behavior change, it is necessary that technology should be used to assist humans and change their behavior as per the need of the hour. This design intervention was found to require a service assistance to address the need. In this condition too, the product characteristics could not be entirely mapped to the service characteristics. As shown in Table 7.5, only realized value and perceived value could be mapped in this type of design intervention.

Table 7.4 Mapping of service and product characteristics for product design with complete automation

Service characteristics of garbage disposal service	Product characteristics of the new garbage bin	Source
Realized value	Realized value	RTD case study
Elementalability	–	–
Perceived value	Perceived value	RTD case study
Quality	Quality	RTD case study
Upgradability	–	–
Presentability	Sustained use	RTD case study
Exclusivity	–	–

Table 7.5 Mapping of service and product characteristics for product design with partial automation

Service characteristics of garbage disposal service	Product characteristics of the new garbage bin	Source
Realized value	Realized value	RTD case study
Elementalability	–	–
Perceived value	Perceived value	RTD case study
Quality	–	–
Upgradability	–	–
Presentability	–	–
Exclusivity	–	–

7.6.1 Mapping the Characteristics Without Any Abstraction

For observation purpose, mapping of product characteristics to the service characteristics, without abstraction, was tried. The mapping was done on the basis of the definition of the characteristics, and an explanation was reasoned for the possibility of mapping. The mapping with an abstract explanation is mentioned in Table 7.6, which indicates the one-to-one mapping of the product and service characteristics and also depicts that certain aspects of both service and product stand out and do

Table 7.6 Mapping of service and product characteristics without any abstraction

Product characteristics	Service characteristics	Explanation: characteristics related to...
Functionality	Complexity, routineness, standardization, features, flexibility, evolutionability	The basic operation of the creation
Quality	Quality, durability, reliability	Testing/comparison of the creation
Packagability, marketability	Service presentability	The first impression of the user
Value, life	Transactionability	The life of the creation which also determine the value generated using the creation
Fabricability, installability	Encounterability	The possibility of bringing the creation and user to interact
Form	Modularity, expandability, granularity	The structure of the creation
–	Heterogeneity, perishability	The characteristics that have a variable component of time for the existence of the creation
Perceived affordance	–	The characteristics that deal with the perceived usage of the product
Appeal, feel, aesthetics, variants	–	The external aesthetics of the creation
Maintainability	–	The unhindered usage of the creation
Environment friendly	–	The effect of the creation in the space in which it exists
Safety for use	–	The effect of the creation on the user who uses it
Material	–	The matter from which a creation is made
–	Intangibility	The characteristics of the creation that is not related to the physical existence
–	Inseparability	The characteristics of the creation that shows that it cannot exist in isolation. (service, as a whole, is produced and consumed at the same time)

not get mapped. There is a possibility of these unmapped characteristics to be mapped into the new services that are to be designed.

7.7 Conclusions and Direction for Future Work

Based on the first case study, the mapping of product to service characteristics reaffirms that a need fulfilled by an existing product can be catered to by a service replacing the product. Almost all the characteristics of the product got mapped in the newly designed service. The second case study brings in an understanding that irrespective of the type of service, the characteristics of a service is very difficult to be mapped completely to product characteristics considering the feasibility and acceptability of the product by the customers or the end users. It was observed that a product replacing a service cannot function completely on its own to address the need. Hence, it will always require some service to address the customers' need entirely.

Based on the mapping exercise, it was observed that a product highlights its functionality based on the user's perceived affordance, irrespective of the functionality that the product has been designed for. However, the same is not the case with a service. A service designed to cater to a specific need cannot have any perceived affordance. This can be a good differentiating factor between a service and a product and has an opportunity to be investigated further through case studies.

The RTD methodology used to analyze the mapping of product to service characteristics was limited and was done considering only one product type in the case study. The characteristics of every product differ as per its usability and perceived affordance, so the mapping exercise done in this research may not help to build a strong holistic understanding. Hence, we suggest that a number of products catering to different fields of usage should be taken and checked for its possible mapping to establish a further strong statement. A direct mapping of product characteristics to service characteristics, based on the functional definitions, clearly bifurcate the characteristics which are possible to be mapped and those which are not. Thus, it offers an opportunity to check how these characteristics can be mapped and how it can help in generating value for both the service provider and the user.

References

1. Snelders, D.: Service design Without Technology is No Longer an Option. <https://www.tudelft.nl/en/ide/research/discover-design/service-design-without-technology-is-no-longer-an-option/> (visited on 05/04/2018)
2. Godin, D., Zahedi, M.: Aspects of research through design: a literature review. In: DRS 2014: Design's Big Debates, vol. 1, pp. 1667–1680 (2014)
3. Hanington, B., Martin, B.: Universal Methods of Design. Rockport, Beverley, MA, USA (2012)

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4. Kawakita, J.: *The Original KJ Method*. Kawakita Research Institute, Tokyo (1991)
5. Adams, J.L.: *Good Products, Bad Products* (2012)
6. Salustri, F.A.: A List of Product Characteristics. <http://deed.ryerson.ca/~fil/t/pc-list.html> (visited on 04/04/2018)
7. Bloch, P.H.: Seeking the ideal form: product design and consumer response. *J. Mark.* 16–29 (1995)
8. Gibson, J.J.: *The Theory of Affordances, Perceiving, Acting and Knowing* (1977)
9. Norman, D.: *The Design of Everyday Things, Revised and Expanded Edition* (2013)
10. Wemmerlöv, U.: A taxonomy for service processes and its implications for system design. *Int. J. Serv. Ind. Manage.* **1**, 20–40 (1990)
11. Buzacott, J.A.: Service system structure. *Int. J. Prod. Econ.* **68**, 15–27 (2000)
12. Bitner, M.J.: Evaluating service encounters: the effects of physical surroundings and employee responses. *J. Mark.* 69–82 (1990)
13. Hoffman, K.D., Bateson, J.E.: *Essentials of services marketing: Concepts, strategies and cases*, South-Western Pub (2001)
14. Haesen, R., Snoeck, M., Lemahieu, W., Poelmans, S.: On the definition of service granularity and its architectural impact. In: *International Conference on Advanced Information Systems Engineering*. Springer, Berlin (2008)
15. Wang, Y., Xu, Z., Sun, Y.: Research of online expandability of service grid. In: *International Conference on Grid and Cooperative Computing*. Springer, Berlin (2003)
16. Dörbecker R., Böhm T.: The concept and effects of service modularity—a literature review. In: *46th Hawaii International Conference on System Sciences (HICSS)* (2013)
17. Taura, T., Nagai, Y.: A definition of design and its creative features. *International Association of Societies of Design Research* (2009)
18. Bitner, M.J.: Servicescapes: the impact of physical surroundings on customers and employees. *J. Mark.* 57–71 (1992)

Appendix 8

Behaviour
Progression
Framework
for Designing
Sustained
Behaviour
Change

ICoRD 19,
Bangalore



Chapter 4 Behaviour Progression Framework for Designing Sustained Behaviour Change

Ravi Mahamuni, Pramod Khambete and Ravi-Mokashi Punekar

Abstract This paper proposes a Behaviour Progression Framework for designing sustained behaviour change. Service Design discipline has matured, but design for Behaviour Change discipline is still emerging. The need to influence and change user behaviours of individual and social well-being is now well acknowledged. One source of guidance for effective change interventions is behaviour theories and models rooted in psychology, sociology and behavioural economics fields. Service design focuses on value creation over a long duration and accounting for the diversity of users and dynamic usage contexts, with the recognition of the individual situated in a social context as the locus of change. In view of the variety of sources of knowledge, literature review from a service design perspective has potential to capture the relevant congruence and generative relationships. This knowledge is blended with thoughtful practice and is proposed as a Behaviour Progression framework to help service designers during service design for sustained behaviour change.

4.1 Introduction

Design interventions influence people's behaviour directly or indirectly. It is a powerful catalyst for behavioural change, which can enable, inspire or discourage contextual actions from taking place. It is well accepted that designers engage in '*devising courses of action to change existing situations into preferred ones*' [1]. It is widely accepted that design directly or indirectly influences the human behaviour,

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but this understanding is still evolving. A plethora of behaviour change theories exist, but only a handful of frameworks are available for effective implementation [2]. During the past decade, design thinking and service design methodologies have played a crucial role in solving social and business problems. It is making people's lives better [3] through direct or indirect influences. It is widely recognized that designers are in the business of behaviour change, and design of objects, services, environments and servicescape can play a crucial role in influencing human behaviour.

Design for behaviour change can create intentional and unintentional, both desirable as well as undesirable effects. Generally, the undesired consequences are not considered while designing and may create long-term problems. Design, change and behaviour are so intertwined that it draws from the various behaviour theories, design for behaviour change models and others. Due to lack of actionable guidance, there is a need for a coherent set of approaches or framework to guide designers decide which stakeholders' perspectives should be considered and how to make it an ethical endeavour [2]. Service design focuses on value co-creation over a long relationship period and draws on diverse disciplines such as human-centred design, interaction design, service marketing, service management and service operations.

Through the literature review, we extracted behavioural principles, guidance, strategies and patterns from behavioural theories and models. Similarly, design principles, guidance, strategies and patterns were also extracted for service design and allied fields. Special attention was given to the role of technology and servicescape in effecting behavioural change. This review provides a summary and critique to resolve overlap, redundancies and inconsistencies in the literature and proposes the Behaviour Progression Framework.

4.2 Service Design

Services evolve over time through a chain of events and steps that co-create value for the service user [4]. Design of these services is a service user-centric activity of orchestrating people, infrastructure and communication as a holistic socio-technical system [5]. Traditional design interventions for problem solving often focus on the need for designing a certain product, merely guided by the design brief that encompasses only a few aspects of the known problem. Though in current times, Design Thinking has been globally popular as a strong driver of user-centric business development. Nevertheless, it often faces criticism for lacking integration with business and compatibility with market reality [6]. However, Design Thinking, being an integral part of Service Design discipline, attempts to bring the core focus of any innovation from business to its users. It provides a holistic view to problem solving, leverages on trans-disciplinary collaborations, and encompasses empathy for existing social fabric, environment, business, human touchpoints and most importantly the user who is the prime receiver of any design solution. It is well established now that Service Design, through its comparatively longer engagement

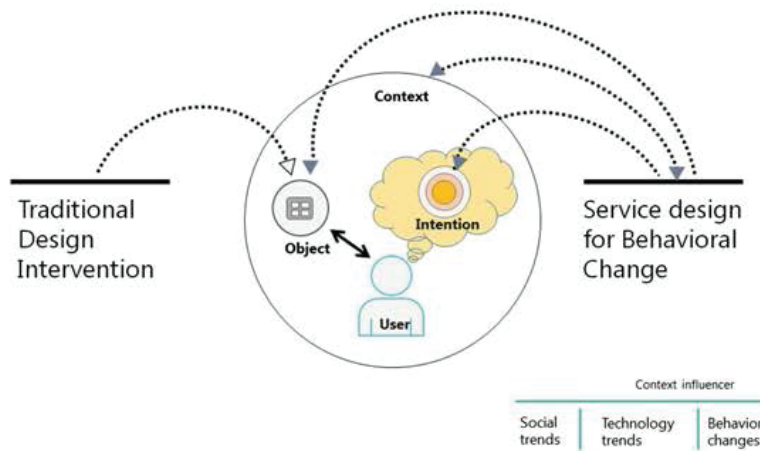


Fig. 4.1 Holistic service design for behavioural change

with its users, has a definite and strong role to play in influencing user behaviour through its product-service systems.

Traditional design interventions for problem solving often focus on the need for designing a certain product in a given problem context. Although human centric product design attempts to fulfil the utilitarian goals of the user, it often neglects the unstated and latent needs of the user in the contextual environment. In the era of service design, it is no longer object-centred, instead, needs to consider how we can help users to achieve their goals in the given context. The context is influenced by social trends, technology trends along with the design interventions, which will, in turn, affect the context for which it was initially designed. We have represented the holistic approach for Service

Design for behavioural change against traditional design interventions approach as shown in Fig. 4.1.

Service Design for Behavioural Change aims at refocusing the intent of any design intervention to the users' actual needs (stated or latent), facilitating a phase-wise transition to an improved behaviour through planned design interventions, irrespective of its medium. To understand the needs and desires of the involved stakeholders, being empathetic to stakeholders is one of the prime tools that the design community vests on to generate meaningful insights.

4.3 Design for Behaviour Change and Ethics

It is widely understood that design naturally has an impact on human behaviour, which is dependent on many variables such as, context and motivation. There is also a general admission that designers need to take responsibility for the designed user actions [2]. Human behaviour change and the ethics are generally discussed together. Ethics affect people's decision-making about what is good for individuals

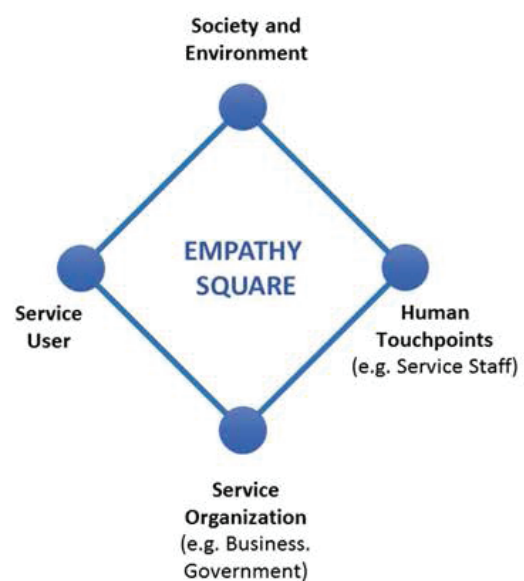
and society and is also described as a system of moral principles or philosophy. It is derived from the Greek word *ethos* which can mean custom, habit, character or disposition [7].

'Ethics is based on well-founded standards of right and wrong that prescribe what humans ought to do, usually in terms of rights, obligations, benefits to society, fairness, or specific virtues.' By Manuel Velasquez and others [7].

Being ethical is abstracted as behaviour about autonomy, dignity, and avoiding manipulation. Design interventions should not, and need not, compromise either dignity or self-governance. Transparency and public scrutiny are important safeguards [8]. Behaviour change varies from a micro in nature such as influencing buying behaviour to large-scale social changes like lifestyle changes. It is evident that usually there are many stakeholders involved in any situation and therefore the question arises as to whose preferences are to be addressed for design intervention [2]. We have represented this as 'empathy square' (Fig. 4.2) that combines the important dimensions such as perspectives from the service user, society and environment, human touchpoints such as service staff and service organization like governments or businesses. This empathy square comes handy to scrutinize the interventions from the perspective of four prime stakeholders. It is also a part of the proposed Behaviour Progression Framework, which is explained in a subsequent section.

Empathy Square helps a designer to deal with the array of views and perspectives. It provides structure to position design interventions as ethical. The proposed design intervention may be a design sustainable not only for the individual service user but for all of us as a society and for the future generations. The empathy square attempts to balance the needs and aspirations of four stakeholders. Due to its micro-to macro-level impact, influencing behaviour change has received much attention from policy makers and practitioners from a range of domains.

Fig. 4.2 Service design empathy square



For example, India being a growing economy with a billion population, the problem of proper garbage dumping is one wicked problem beyond the capacity of mere product-oriented design intervention. In Ahmedabad (India), 200 ml drinking water is available for purchase in small plastic-made pouches of INR 2.00 (approx. 0.03 USD). These water pouches are available at almost every tea shop, chilled and ready to serve. It is one of the most affordable and widely used and cherished products among the residents and visitors of the city. However, the after-use of the product has a major impact on the cityscape. Only a small percentage of these plastic pouches get recycled and the rest either go to the city hills or mixes within the cityscape. The roots of the problem, if observed carefully and holistically, is not easily traceable but is entwined within human behaviour, cultivated habits, available alternate products, evolved desires, awareness and induced ignorance. Hence, by solving just one part of the problem may not provide a sustainable solution, but there is a need for a more systemic design intervention directed towards creating a new ecosystem. A potential ecosystem must address the need of the service users, the environment and the social fabric, maintain a profitable business for all stakeholders and yet cultivate a new behaviour of drinking water [9].

As water pouches dumping problem illustrated, there is a need for a holistic service design for behaviour change, which is a multidisciplinary endeavour. The popularization of theories from behavioural economics has added an important dimension to the knowledge available from other behavioural sciences. We examine several theoretical and practice-related perspectives to suggest directions to build a service design framework oriented to sustained behavioural change.

4.4 Literature Review

The aim of the literature review was to develop an integrative overview of design for behaviour change approaches and their relationships from a service design perspective.

Services are distinct than products due to their characteristics such as variability, simultaneity, perishability, inseparability and intangibility [10]. This gets reflected through service design, which has its unique characteristics such as value co-creation, temporality, lifetime engagement, granularity, extensibility, evolvability, linkages and relationship [11]. The service design process which addresses these characteristics needs to have a holistic approach, multiple stakeholder involvement, contextual data collection, visual evidencing, goal flexibility, co-creation and iterative validation. These service design perspectives were considered during shortlisting the behaviour change models and synthesizing it.

The literature review has explored the current approaches to design for behaviour change to provide a broad cross-sectional overview from the social and behavioural sciences and how these have informed relevant service design approaches. Several disciplines are involved with human behaviour and behavioural change. As well, behavioural change interventions would occur at various levels—

products, services and moving up to the public policy. As a result, several theories and models have been proposed to guide the interventions and they can be categorized in multiple ways. One of the ways is to categorize them depending upon their disciplines.

The list [12] is indicative but still overwhelming for the designers. This literature review is not meant to be comprehensive instead, it seeks to offer a useful and robust framework for designing services imparting a behavioural change. As part of our approach, we build on the outcomes of the systematic efforts put by various institutes and researchers. The following criteria have been used to short-list the theories and models under consideration:

1. Key theories and models of behaviour change from the social and behavioural sciences as identified as part of a project funded by the Arts and Humanities Research Council under the 'Design in Innovation' call, 2013 [2].
2. Theories which are contributed significantly to the development of four or more theories as listed in the book titled 'ABC of Behaviour Change theories' by Michie et al. [13]
3. Theories which are based on four or more theories as listed in the book titled 'ABC of Behaviour Change theories' by Michie et al. [13]
4. Behavioural wheel developed from triangulating literature and interview data [14]
5. Design with Intent [15] draws upon different theories to outline a collection of multiple tools and techniques that enable, motivate or constrain the user to encourage desired actions.
6. Behaviour change design toolkits
7. Darnton's [16] review of 60 social-psychological models of behaviour and theories of change.

We observed that all these models and framework can be categorized as, approaches to understand the individual behaviour and context, determine types of the behaviour, the process of behaviour change and theories about what are the steps individuals take before taking actions. There are a few models which have focused on the guidance for behaviour change. The available knowledge about behaviour change and design for behaviour change is very comprehensive but lacks coherence and actionable guidance. The available information is so overwhelming that the designers are likely to become confused and would not know from where to start and how to proceed to impart the sustained behaviour change. We also observed that there are multiple theories and models which are based on single case study and very specific to the given problem lacking the generalisability. The IDEAS framework [17] has similar intent, but does not focus on sustained behaviour change and mostly provide the process guidance. It also discusses from service user perspective only and does not explicitly mentions other perspectives as mention in 'empathy square' (Fig. 4.2).

To address these challenges, we further shortlisted theories and models which have close affinity from a service design perspective. For instance, the Stages of

Change model (SoC) which is also known as the Transtheoretical model (TTM) [18], the Precaution Adoption Process [19] explains how behaviour change happens at individual or group level. It was then overlaid with the behaviour wizard [20] for various behaviour intentions along with dot, span, path changes. The models and approaches which are closer to intervention guidance were divided into who addresses intervention strategy, intervention design and intervention execution to reduce the confusion and provide clarity to the service designers. We found that few models like Michie’s wheel [14] were operating at multiple levels and it is difficult to clearly segregate them. Hence it was kept open for contextual interpretation. It helped to map existing body of knowledge into different intervention layers.

The proposed Behavioural Progression Framework provides the approach to meet a certain behaviour change intention through a set of design interventions.

4.5 Behaviour Progression Framework

The Behaviour Progression framework (refer Fig. 4.3) depicts the integrated view of the ethical perspectives of multiple stakeholders, various intentions along with behaviour change stages to reach the internalization state. The mental state shows what will help the user to move to the next state.

Elements of the Behaviour Progression Framework

Empathy Square The different stakeholders in the given service-system for which Design for Behaviour Change is to be undertaken.

Service User The node of the empathy square that symbolizes the primary stakeholders associated with the service system. The service user is the primary recipient of the service experience.

Society and Environment The node of the empathy square that symbolizes the stakeholders associated with societal and environmental perceptions and factors in the given service-system.

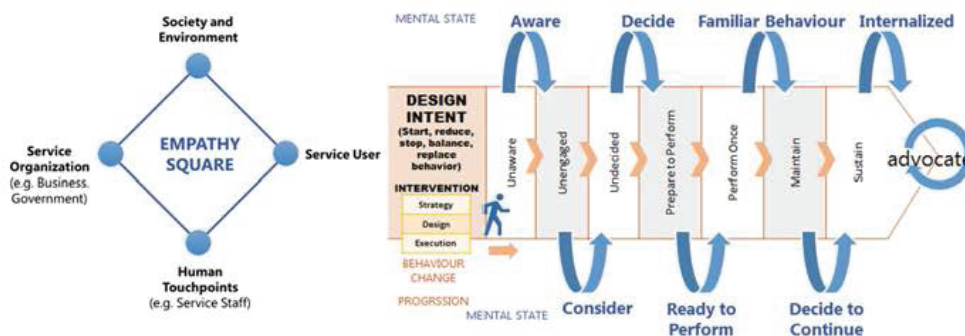


Fig. 4.3 Behaviour progression framework

Human Touchpoints—The node of the empathy square that symbolizes the stakeholders associated with providing services and acting as service-touchpoints in a given service-system.

Service Organization—The node of the empathy square that symbolizes the stakeholders associated with executing a service-based organized business in the given service-system.

Behaviour Change Progression—The progressive behavioural stages of an individual to be considered while designing interventions for sustained behaviour change.

Design Intent—The intention of an activity guiding Design for Behaviour Change (for example, start, reduce, stop or balance behaviour), i.e. Behaviour Change Intent.

Intervention Strategy—This layer provides the strategy level guidance from existing knowledge on how to approach, what aspects need to be considered.

Intervention Design—This layer provides the next level of guidance which can help to design interventions.

Intervention Execution—The layer provides guidance from intervention execution perspective.

Unaware—The stage of behavioural change that instructs design interventions to aid individuals to be aware of their existing behaviour.

Aware—The mental state of being aware of the existing behaviour, new behaviour and understanding the intent for behaviour change.

Unengaged—The stage of behavioural change that instructs design interventions to engage individuals in activities to promote conscious consideration for a change of behaviour.

Consider—The mental state of realizing the opportunities and benefits of initiating activities for a change of behaviour, but not yet decided to take action.

Undecided—The stage of behavioural change that instructs design interventions to aid individuals to decide consciously to undergo a behaviour change activity.

Decide—The mental state of decision making to perform appropriate actions for behaviour change.

Prepare to Perform—The stage of behavioural change that instructs design interventions to proactively aid individuals and prepare their contextual environments to perform an activity for behaviour change.

Perform Once—The stage of behavioural change that instructs design interventions to facilitate initiation of a behavioural change activity for the first time.

Ready to Perform—The mental state of inculcating cognitive confidence while approaching to perform an activity for behaviour change.

Familiar Behaviour—The mental state of recalling familiarity with a given behavioural activity that an individual achieves by performing it at least once.

Maintain—The stage of behavioural change that instructs design interventions to facilitate continuation in a performance of an activity.

Decide to Continue—The mental state of decision-making to continue or repeat performance of an activity for sustained behaviour change.

Sustain—The stage of behavioural change that instructs design interventions to prevent individuals from dropping out of the newly inculcated behaviour.

Internalized—The mental state of inculcating a behaviour as part of one's natural self.

Advocate—The stage where a user starts advocating the behaviour change and motivates others.

The design intentions (latent or stated) can be listed as an introduction of new unfamiliar behaviour, an introduction of new familiar behaviour, reduction of existing behaviour duration, reduction of existing behaviour intensity, increase in existing behaviour duration, increase in existing behaviour intensity and stopping behaviour [20]. The shared resources such as time available, energy, effort and social support pose the constraints for individuals for undergoing behavioural change. Due to the individual's constraints, a designer needs to 'balance' multiple behaviours or sometimes 'replace' an existing behaviour. For example, if parents want their children to spend more time in studies, but want them to be healthy too, the free time available and energy become the constraints. The children need to balance between studies and sports activities considering these constraints. While introducing a new behaviour, we might be replacing the existing behaviour because even doing 'nothing' is an existing behaviour. Suppose we want to introduce the morning jogging behaviour where the existing behaviour might be being lazy to come out of the bed and keep checking the smartphone. In this situation, we need to design interventions to replace this existing lazy behaviour with new 'jogging' behaviour.

4.6 Applying the Framework to Design a Case Study

To achieve the sustained behaviour change, the list of intentions (stated and or latent) needs to be identified. Considering the example of the two-rupee water pouches from Ahmedabad; some of the stated intentions are—the need to reduce consumption of water pouches and subsequent reduction in post-product-usage litter and waste creation, proper disposal of used water pouches and adequate recycling of the same, product replacement to be profitable to retailers (service providers) and affordable to service users, and so on. Some of the latent intentions that could be identified for the service user, in this example, are—economic affordability of fresh drinking water, availability of chilled fresh water on-demand, minimization of health hazard due to an improper dumping of used water pouches, prevention of deterioration of cityscape aesthetics and overall living-conditions of city residents.

We represent the landscape of the various behavioural change possibilities in Behaviour Change Matrix (refer Fig. 4.4). It will help a designer to decide the intervention quadrant and then get the guidance of intervention strategies for this intended behaviour change.

<i>New desired behavior</i>	Reduce Existing Stop Existing Replace Existing with New (Existing – Use of water pouches, New – Use of reusable water bottles)	Increase Existing (If no constraints) Start New Balance (If constraints) (Existing – Use of reusable water bottles, New – Transition to freshly served fruit juices)
	<i>New undesired behavior</i>	Prevent New Stop Existing Reduce Existing (Existing – Use of water pouches, New – Use of aerated soft-drink cans)
	<i>Existing undesired behavior</i>	<i>Existing desired behavior</i>

Fig. 4.4 Behaviour change guidance matrix

To achieve each such stated or latent intention to acquire new unfamiliar behaviour; the service user needs to go through various change stages that are from being unaware till sustain. In our given example, in order to incorporate the behavioural transition from current usage of water pouches for quenching thirst, to adapting a new familiar behaviour such as a transition to refilling the reusable water bottles, the user will undergo the same journey of behavioural change stages.

When the designer designs the intervention first from the perspective of one node of the empathy square, for example, service user, it will be then triangulated with the remaining nodes to make sure that it is not adversely influencing the rest. For example, a design intervention for the service user like facilitation of behaviour transition to a preference of reusable water bottles needs triangulation with the other stakeholders in the empathy square. Although such a design intervention facilitates inculcation of an environmentally sustainable action for the service user, further refinement of the intervention has to be initiated so as to ensure it to be societally and environmentally ethical, profitable and easy-transitional as business and service-touchpoints for retailers (service providers), and also feasible and viable as new service-based business for the erstwhile product-based businesses in the system. In our example, a possible behavioural design intervention can be that of inculcating a habit of carrying personal water bottles. Service Business can instal drinking water kiosks to refill fresh and purified drinking water, which can be either a government-supported initiative or a business run by private water packaging industries, operating on pay-per-use basis. These kiosks can even provide the facility to clean the bottles to reduce the reusable bottle hygiene anxiety. Fostering the idea of less litter creation by reducing the usage of the water pouches needs a

designed systemic intervention by thoroughly understanding the needs and desires of all the stakeholders.

Intervention strategy for each cell will guide the designer in what to do in that phase to achieve the intended behaviour change. Models or frameworks like Michie's wheel [14] fall into this category. It is now when this high-level strategy gets closer to realization with the intervention design. While designing interventions, the service designer needs to understand and cater to how the user performs the action. The C-R-E-A-T-E model [21] is very useful here which tries to encourage a conscious choice or an intuitive response. The main purpose of considering this model while designing the interventions is to understand the various leverage points, which provide users opportunities to continue by providing more effective or better than the known alternatives. Intervention guidance layers of the Behaviour Progression Framework will help designers to realize this sustained behaviour change in a progressive manner with a checkpoint at each stage.

This proposed framework has shown promise during early validation with industry practitioners and through various thought experiments. One of the practitioners mentioned that it can be used to even check the completeness of the interventions, whether it is addressing all the phases of behaviour change. The detailed validation process and the results are part of the future work.

4.7 Conclusion and Future Direction

The proposed Behaviour Progression framework that emerged through the literature review may address the lack of an absence of a coherent set of approaches or framework to guide. A key insight from this review is that for Service Design for behaviour change, the holistic intentional and unintentional changes along with their consequences need attention during design. We believe that the application of proposed empathy square, guidance matrix along with Behavioural Progression framework will help the service designers to decide which stakeholder perspectives need consideration and how to approach designing the interventions for sustained behaviour change. The insights would be useful to guide service design practitioners in designing interventions for behavioural change—Policy level (for example, citizen well-being and welfare, poverty alleviation, sustainability), Social Sector (for example, livelihood creation, empowerment), Organizational level (for example, employee assimilation, employee well-being, work-life balance, compliance with norms). This knowledge blended with thoughtful practice has the potential to lead to the successful solutions and meaningful value propositions for the users.

In future, we will be proposing the recommendation mechanism for intervention strategy, intervention design and execution guidance depending upon the intent and problem context from shortlisted theories and framework. We are in process of validating this proposed framework through cases studies from varied domains for completeness and effectiveness.

References

1. Simon, H.A.: *The Sciences of the Artificial*. Cambridge, MA (1969)
2. Niedderer, K, Mackrill, J., Clune, S., et al.: *Creating Sustainable Innovation Through Design for Behaviour Change: Full Project Report* (2014)
3. Mamykina, L., Candy, L., Edmonds, E.: Collaborative creativity. *Commun. ACM* **45**, 96–99 (2002)
4. Bitner, M.J., Ostrom, A.L., Morgan, F.N.: Service blueprinting: a practical technique for service innovation. *Calif. Manage. Rev.* **50**, 66–94 (2008)
5. Fensel, D., Facca, F.M., Simperl, E., Toma, I.: *Semantic Web Services*. Springer Science & Business Media (2011)
6. Brautigam, B.: How Design Thinking will Fix Design Thinking. <https://medium.muz.li/how-design-thinking-will-fix-design-thinking-5ce735b4c029> (visited on 21/09/2018)
7. Ethics: A General Introduction. http://www.bbc.co.uk/ethics/introduction/intro_1.shtml (visited on 21/09/2018)
8. Sunstein, C.R.: *Nudging and Choice Architecture: Ethical Considerations* (2015)
9. Das, B.: Design for Tomorrow is not About mere Problem Solving but Cultivating a Better Co-living Ecosystem. <https://bhaskarjyotidas.com/2017/02/20/design-for-tomorrow-is-not-about-mere-problem-solving-but-cultivating-a-better-co-living-ecosystem/> (visited on 21/09/2018)
10. Taura, T., Nagai, Y.: A definition of design and its creative features. In: *International Association of Societies of Design Research* (2009)
11. Prahalad, C.K., Ramaswamy, V.: *The Future of Competition: Co-creating Unique Value With Customers*. Harvard Business Press (2004)
12. Mahamuni, R., Khambete, P., Mokashi-Punekar, R.: Service design for behavioural change-current state of the discipline and practice in India. In: *ServDes2018. Service Design Proof of Concept, Proceedings of the ServDes. 2018 Conference*. No. 150, pp. 62–75, Linköping University Electronic Press (2018)
13. Michie, S.F., West, R., Campbell, R., Brown, J., Gainforth, H.: *ABC of Behaviour Change Theories*. Silverback Publishing (2014)
14. Michie, S., van Stralen M.M., West, R.: The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Sci.* **6**(1), 42 (2011)
15. Lockton, D.: *Design with intent: a design pattern toolkit for environmental and social behaviour change*. Dissertation, Brunel University School of Engineering and Design PhD Theses (2013)
16. Darnton, A.: *GSR behaviour change knowledge review. Practical guide: an overview of behaviour change models and their uses*. Report for Government Social Research Unit. London, Centre for Sustainable Development, University of Westminster (2008)
17. Mummah, S.A., Robinson, T.N., King, A.C., Gardner, C.D., Sutton, S.: IDEAS (Integrate, Design, Assess, and Share): a framework and toolkit of strategies for the development of more effective digital interventions to change health behavior. *J. Med. Internet Res.* **18** (2016)
18. Prochaska, J.O., Velicer, W.F.: The transtheoretical model of health behavior change. *Am. J. Health Promot.* **12**, 38–48 (1997)
19. Weinstein, N.D.: The precaution adoption process. *Health Psychol.* **355** (1988)
20. Fogg, B.J., Hreha, J.: Behavior wizard: a method for matching target behaviors with solutions. In: *Proceedings of International Conference on Persuasive Technology*, pp. 117–131. Springer, Berlin (2010)
21. Wendel, S.: *Designing for Behavior Change: Applying Psychology and Behavioral Economics*. O'Reilly Media, Inc (2013)



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EMPATHY SQUARE: AN AID FOR SERVICE DESIGN FOR BEHAVIOUR CHANGE TO SUPPORT SUSTAINABILITY

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ABSTRACT

Service Design for sustainability requires an integrative intertwined approach for interventions addressing economic, environmental, and social concerns. These design interventions are socio-technical in nature where human beings play a crucial role. To contribute to the larger cause of sustainability, people may have to change their behaviour according to a complex pattern: behaving in a desirable manner once, for a short duration and eventually sustaining the behaviour for a long time. Inducing behaviour change in people often poses an ethical dilemma. Assuming that services trigger new behaviours, designers need to achieve a delicate balance between the concerns of the service-user, human-touchpoints (service staff), service organization and the society or environment as a whole in order to foster more sustainable habits. When designers attempt to address the concerns of all these four stakeholders represented as the Empathy Square, it enables them to facilitate a balanced and ethically appropriate service design solution.

Key Words: Sustainability, Service Design, Behaviour change, Empathy Square

Appendix 9

Empathy

Square: An

Aid for Service

Design for

Behaviour

Change to

Support

Sustainability

Designing

Sustainability

for All-3rd

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1. INTRODUCTION

Service Design for sustainability requires a human-centric, holistic and integrative approach that balances the individual's perspective and the larger economic, environmental, and social concerns. The design interventions are socio-technical in nature in which human beings play a crucial role. To contribute to the cause of sustainability, people often need to change and align their behaviours to sustainability goals. They may have to adopt a new behaviour, increase desirable behaviour, decrease and eventually cease current undesirable behaviour, or sometimes balance between the two equally desirable behaviours. These behaviour changes would typically progress as one time, initial behaviour change, a continuation of the changed behaviour for a short duration of time and eventually sustaining the behaviour for a long period of time (Fogg, 2009). Considering the noble cause of sustainability, people would progress from being unaware of the needs and suitable behaviours to become the advocates of the intended, desirable behaviour change.

Induced behavioural change often poses an ethical dilemma for designers because there is no universal truth about what is ethical and what is not. Instead, an ethical approach is considered as the act of making conscious and deliberate decisions addressing concerns of all stakeholders in a particular context (Acaroglu, 2019). It becomes challenging for service designers to select the consequential ethics approach i.e. maximise the best outcome for the most people or deontological ethics approach i.e. do the right thing using whatever is current 'rightness' (Acaroglu, 2019). Considering the subjectivity associated with the ethical dimensions of human behaviour, it becomes challenging for service designers to coincide both ethical approaches to initiate and facilitate design interventions. This paper explains how to navigate through this ethical dilemma by balancing the concerns of multiple major stakeholders while designing services for sustainability.

1.1. Sustainability from a social, economic and environmental perspective

Several researchers define sustainability as an interconnection between three pillars – environmental sustainability, economic sustainability and social sustainability (Elkington, 1997). Environmental sustainability is the process of maintaining a balanced environment by considering factors like conservation of natural resources and environmental protection among others on a long-term basis. Social sustainability aims at creating healthy and liveable communities both for current and future generations. Economic sustainability aims at having long lasting and fair activities. Overall, sustainability is a broad area of research aiming at design, development, and use of resources in the environment to ensure a balance between meeting the current and futures needs, while achieving social justice. Achieving sustainability requires intricate attention and conscious efforts towards the design and development of products and services. It involves a holistic approach considering technologies, change in human behaviour, man-made architectures, consumption of natural resources, and so on.

Environmental and social sustainability related problems are rooted in human behaviour. For example, the way we consume natural resources might lead to scarcity of that resource in future or the way we use products (e.g. vehicles) for our convenience might lead to unsafe (polluted) environments for our future generations. To achieve and to maintain environmental and social sustainability, individuals can contribute significantly by promoting sustained behaviour that can contribute to a greater cause (Abusafieh & Razem, 2017). Therefore, there is a need to examine the role of human behaviour while designing sustainability-driven solutions. It is well established that design interventions influence user behaviour and hence, designers have the potential to consciously design products, services, and systems with an intent to change people's behaviour. While cultivating human values and socially desirable behaviours, designers need to understand the human-environment dynamics in promoting pro-environmental behaviour for users.

1.2. Holistic and Integrative Service Design

Designing services that evolve over time through a sequence of events, is a user-centric activity of orchestrating people, infrastructure and communication as an integrative socio-technical system (Bitner, Ostrom, & Morgan, 2008) (Fensel, Facca, Simperl, & Toma, 2011). Service Design provides a holistic approach while solving problems, by leveraging trans-disciplinary collaborations. It encompasses the design of all human-human and human-machine interactions involved in the service. It also focuses on the service environment and the service experiences, by dealing with the emotions and values of humans along with the functionality of the service in a given context. Design in general and Service Design in particular can definitely shape user's behaviour and facilitate to maintain it for a long period. When a service user is using the service for a certain duration, the behaviour of an individual or within a group is influenced by the designed product-service systems. Changing or shaping an individual's behaviour, eventually after a certain time, is a starting point towards the change at a wider level e.g. societal level.

Users of today have an abundance of choices of products and services. Service providers find challenges in being a differentiator in the market and sustaining their users. Value creation through impactful service experiences is the locus of service-providing organizations today. Traditionally, it was a common assumption that organizations can solely design, develop, and sell products and services with little or no interference from their users. This assumption is slowly fading away and the need for value co-creation is becoming more prominent, wherein the users are actively engaged, rather than merely being passive recipients of the service. (Prahalad & Ramaswamy, 2004) (Prahalad & Ramaswamy, 2004). Value co-creation can be defined as a 'benefit realized

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from the integration of resources through activities and interactions with collaborators in the customer's service network." (McColl-Kennedy, Vargo, Dagger, Sweeney, & Kasteren, 2012). Co-creation of value is heavily based on the interactions between the user and the provider, of which the basic components have been identified as dialog, access, transparency, relationship, and some others. (Prahlad & Ramaswamy, 2004) (Hansemark & Albinsson, 2004), Along with the service users, human touchpoints i.e. service staff involved in service, play a crucial role in enabling the value co-creation for a user.

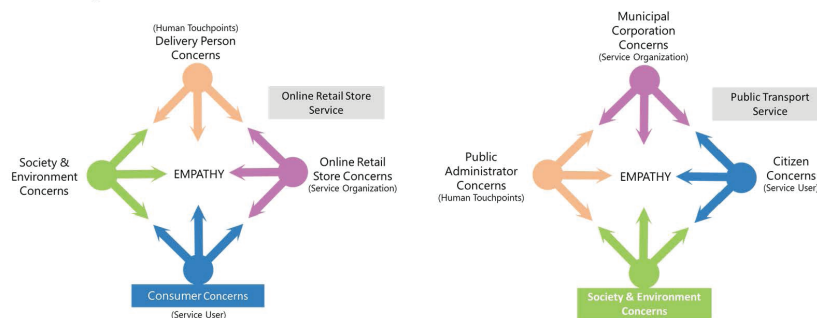
2. ROLE OF BUSINESSES AND CORPORATIONS IN SUSTAINABILITY

Every human being is responsible for shaping a sustainable ecosystem. Individuals, group of individuals, businesses, and government organizations share an active responsibility in crafting and enabling activities that create a symbiotic and sustainable tomorrow. With the increasing rate of climate change affecting the global landscape, it's imperative to include sustainable design as an integral part of business models and state policies. The transformational era of higher automation and interconnectedness in industries compel the later to initiate sustainable design not as a separate corporate social responsibility but as a core to every industrial activity by leveraging on smart solutions that facilitates long term relationship rather than one term consumerism. The movement towards being empathetic towards society and environment as part of the business planning and not as a separate corporate social responsibility i.e. CSR initiative is now evident in organizational practices. It is a right time to adopt social and environmental responsibility through each and every corporate action.

3. EMPATHY SQUARE

Design for sustainability is not just a human-centered design approach but an ecosystem-based holistic design attitude which enables rich symbiosis between the stakeholders constituting the ecosystem. The stakeholders can be majorly categorized as users, design enablers such as industry, service providers, business organizations, society, and environment (includes various flora and fauna). It is imperative that an integrative design approach for sustainability will include the perspectives, concerns, desires, and mutual-benefit of all the stakeholders. Let us take an example; Electric cars are positioned as an eco-friendly vehicle because they run on battery-stored electricity producing no poisonous smoke, minimizing air pollution for a safer environment. However, if one observes with a holistic lens, one can evidently see the amount of pollution that emerges during the manufacturing process of electric batteries that are used in the Tesla cars. Furthermore, it's worth wondering about the lifecycle of all the other materials that are used in the Tesla cars, and their possible impact on the holistic sustainability of our living ecosystem. (Tesla's Electric Cars Aren't as Green as You Might Think, 2016)

The design philosophy of Design for Circular Economy (Ellen MacArthur Foundation, 2015) enables designers to look at the complete lifecycle of products and materials and directs the design ideation from building 'consumership' of products towards 'usership' of the same. Circular Economy enables this paradigm shift in design ideation towards Design for Sustainability by engaging into six principles (Macarthur, 2006) namely: designing out waste, building resilience in diversity, thinking in cascades, thinking in systems, shifting to renewables, and by focusing on restoration and regeneration. There are similar examples, which emphasises on the role of service design for solving sustainability problems by unlocking value for each stakeholder in a value chain. Among the various stakeholders, service staff i.e. human touchpoints are generally getting less or no attention, which may be detrimental for sustainability. On one side, service staff plays a key role in helping service users to encourage, engage, perform and maintain the behaviours towards sustainability. On the other side, it needs are very often neglected, as the staff was not part of a wellbeing equation that is not only crucial for social sustainability, but for the overall quality of the service too (Meroni & Sangiorgi, 2011). It's the prima facie responsibility of the service organizations to take care of the social and financial wellbeing of its service staff.



[Figure 1] CraftChange – Empathy Square (Mahamuni, Khambete, & Mokashi-Punekar, 2019)

Through multiple service design for sustainability projects (Prendeville & Bocken, 2017) (Matthing, 2017) it is evident that the service design solution needs to be empathetic to the concerns of a service user, service organization, human touch points and most importantly society and environment. To achieve this and arrive at a balanced

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and ethically appropriate service design solution for any kind of problems, Empathy square (Mahamuni, Khambete, & Mokashi-Punekar, 2019) as shown in figure 1 seems useful. It can enable designers, all along the design process, to focus on the ecosystemic approach, so to maintain the delicate balance between the concerns of the service-user, human-touchpoints (service staff), service organization and the society or environment. During 1970s Victor Papanek, first asserted that “*Design, if it is to be ecologically responsible and socially responsive, must be revolutionary and radical*” (Papanek, 1970).

The Empathy Square requires the design team to explicitly articulate and match, not only the concerns of the service provider and service user, but also those of the human touchpoints (the staff) and of the society and environments, as entities that have the rights to be “served” and fulfilled in order to achieve sustainability.

In case of online retail shops, to address the concerns of the service user i.e. purchasing required goods effortlessly, anywhere at an affordable cost, service organizations are providing access to the various goods at affordable rates through their websites and mobile apps to the service users leading to the increase in gross revenue. To make it affordable, the service organizations need to address the concerns of the human touchpoints that is in this case, a delivery person from a social and economic wellbeing perspective. While making it affordable to the service users, organizations should not give inadequate wages to the delivery person leading to negligence towards their social and economic wellbeing. The environmental concerns need to be taken care of, by reducing plastic usage as part of packaging and use of non-polluting vehicles to deliver the goods. For example, the iPhone ships with a biodegradable potato-starch-based shipping material rather than plastics (Sheesley, 2008). Thus addressing the concerns of all the four major stakeholders, the overall solution can be sustainable.

There is no sequence to start from a specific node of empathy square. Designers may start with a node that requires immediate attention and can act as an anchor for other three nodes as shown in figure 1. If it's a sustainability initiative, then designers may start from society and environment node and sequentially move to the other nodes. For an employee wellbeing initiative, designer can start with human touchpoint node and then balance the concerns within other nodes. It's important to be empathetic to the concerns of all four nodes while designing the services to sustain it for a longer period of time. We have used Empathy Square in multiple projects in social and business sector; and found it to be promising. It gets operationalized by addressing the concerns with an anchor node and then taking care of concerns of the other three nodes. It is a part of the larger CraftChange framework (Mahamuni, Khambete, & Mokashi-Punekar, 2019) which is achieved through multiple canvases and design enabler cards. CraftChange is Design for Behaviour change framework which has other elements such as add-on process, Current Intervention Cards for user research phase, Ignite Cards for ideation phase, Challenge Cards for validating and prioritizing ideas and Enrichment Cards for checking completeness of ideas. All these elements, along with multiple canvases, have undergone initial testing and seems promising. The work is in progress and would be reported shortly.

4. CONCLUSION

Service design, due to its holistic and long temporal nature, is a desired approach where sustainability concerns are to be addressed in a sustainable manner. It is evident that people's sustained behaviour plays a crucial role in sustainability endeavours. If service design takes care of sustainability concerns by designing for sustained behaviour change, it will contribute to a long lasting impact. Thus, business organizations can change the focus from CSR initiatives to make sustainable service design as a part of their core business strategy. Empathy Square enables the service designers to balance the concerns of multiple major stakeholders, interlinking service design, sustainability and sustained behaviour change.

With a drastic increase in awareness about sustainable actions among people, society and organizations, it is inevitable to address the concerns of all the four stakeholders consistently through actions, as part of their business. This shift from sustainability as CSR activity to becoming a crucial element of core business strategy has started, and this congruence can expedite the process. We believe that this knowledge will be helpful while designing impactful design interventions, addressing sustainability concerns.

BIBLIOGRAPHY

1. Abusafieh, S., & Razem, M. (2017). *Human Behavior and Environmental Sustainability: promoting a pro-environmental behavior by harnessing the social, psychological and physical influences of the built environment*. 23, p. 2003. EDP Sciences.
2. Acaroglu, L. (2019, Jan 25). *How Design Designs Us - The Ethics of Design*. Retrieved from Disruptive Design: <https://medium.com/disruptive-design/how-design-designs-us-part-3-the-ethics-of-design-ca40e33f5842>
3. Bitner, M. J., Ostrom, A. L., & Morgan, F. N. (2008). *Service blueprinting: a practical technique for service innovation*. *California management review*, 50, 66-94.
4. Elkington, J. (1997). *Cannibals with forks: the triple bottom line of twenty-first century business*. Capstone. Oxford.
5. Ellen MacArthur Foundation. (2015). *Towards a Circular Economy: Business rationale for an accelerated transition*. Ellen MacArthur Foundation.
6. Fensel, D., Facca, F. M., Simperl, E., & Toma, I. (2011). *Semantic web services*. Springer Science & Business Media.
7. Fogg, B. J. (2009). *A behavior model for persuasive design*. Proceedings of the 4th international Conference on Persuasive Technology (p. 40). ACM.

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7. Hansemark , O. C., & Albinsson, M. (2004). *Customer satisfaction and retention: the experiences of individual employees. Managing Service Quality: An International Journal*, 40-57.
8. Macarthur, E. (2006). *Towards the Circular Economy*. *Journal of Industrial Ecology*, 4-8.
9. Mahamuni, R., Khambete, P., & Mokashi-Punekar, R. (2019). Behaviour Progression Framework for Designing Sustained Behaviour Change. In *Research into Design for a Connected World* (pp. 39-50). Springer.
10. Matthing, J. (2017). *Connected heating cabinets provide an overview of food transport*. Retrieved 02 01, 2019, from RISE: <https://www.ri.se/en/our-stories/connected-heating-cabinets-provide-overview-food-transport>
11. McColl-Kennedy, J. R., Vargo, S. L., Dagger, T. S., Sweeney , J. C., & Kasteren, Y. K. (2012). *Health care customer value cocreation practice styles*. *Journal of Service Research*, 370-389.
12. Meroni, A., & Sangiorgi, D. (2011). *Design for services*. Gower Publishing, Ltd.
13. Papanek, V. (1970). *Design for the Real World: Human Ecology and Social Change*. Academy Chicago Publishers.
14. Prahalad, C., & Ramaswamy, V. (2004). *The future of competition: Co-creating unique value with customers*. Harvard Business Press.
15. Prahlad, C. K., & Ramaswamy, V. (2004). *Co-creation experiences: The next practice in value creation*. *Journal of interactive marketing*, 18(3), 5-14.
16. Prendeville, S., & Bocken, N. (2017). *Sustainable business models through service design*. *Procedia Manufacturing*, 292-299.
17. Raar, J. (2002). *Environmental initiatives: towards triple-bottom line reporting*. *Corporate Communications: An International Journal*, 169-183.
18. Sheesley, J. (2008, 07 23). *Destroying the planet one iPhone at a time*. Retrieved from TechRepublic: <https://www.techrepublic.com/blog/decision-central/destroying-the-planet-one-iphone-at-a-time/>
19. Tesla's Electric Cars Aren't as Green as You Might Think. (2016, 03 31). Retrieved 02.10.2019, from Wired: <https://www.wired.com/2016/03/teslas-electric-cars-might-not-green-think/>.

Appendix 10

CraftChange:

Behaviour

Progression

Framework

– Evaluation

In Quasi

Participatory

Design Setting

Designing

Sustainability

for All-3rd

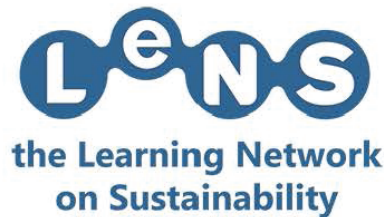
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CRAFT CHANGE: BEHAVIOUR PROGRESSION FRAMEWORK – EVALUATION IN QUASI PARTICIPATORY DESIGN SETTING

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ABSTRACT

Sustainability concerns often stem from human behaviour and practices, and needs sustained change. Product and service design, while driving solutions, are also influential in bringing about change in human behaviour. Yet most designers do not have adequate design guidance based on the established behaviour change theories. The proposed 'CraftChange' Behaviour Progression Framework enables designers through a choreographed process and toolkit of canvases and cards, to arrive at ideas and service concepts which facilitate a user's behaviour progression—from an unaware state to being an advocate of change. The usefulness and effectiveness of this framework was evaluated through a case study aimed at designing a service design solution to "encourage continual learning within a multi-cultural setting". Initial results are encouraging and show the promise of being the preferred toolkit for service designers aiming at sustainability initiatives like encouraging smart transport, promoting healthy food habits, and amplifying sensitivity towards the environment.

Key Words: Design for Sustainability (D4S), Design for Behaviour Change (DfBC), CraftChange, Service Design

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1. INTRODUCTION

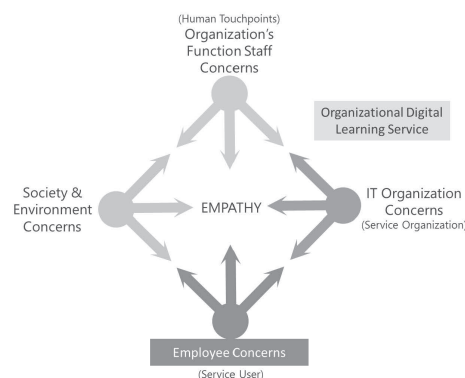
Human behaviour is a crucial aspect of sustainability (Fischer, et al., 2012) (De Young, R., 1993) (Lilley, 2009) and enabling design to facilitate the desired change in user behaviour is critical in envisaging a sustainable tomorrow. Design for Sustainability is not a single stakeholder centric approach but demands extensive participation from all the stakeholders in our living ecosystem, who maintain a symbiotic relationship with each other, such that their desires, concerns and constraints are taken into consideration from the initial design phase itself. Reflecting on the current design practices for ecosystem-wide sustainability, Design for Circular Economy (DfCE) (Ellen MacArthur Foundation, 2015) is globally accepted today as an approach to sustainable design by facilitating the industry to transition from being a linear-based economy to a circular or closed loop one, enabling multiple value streams and cascading resource usage by promoting ‘usership of services’ rather than ‘consumership of products’. Sustainability design directives such as DfCE envisions to change stakeholders’ behaviour at various stages of a resource life-cycle through services that facilitate effective and sustainable resource management. Developing functionally superior technology and infrastructure may not alone address the severe sustainability issues rooted in human behaviour. Achieving desirable behavioural changes at individual, societal, and organizational level is the need of the hour in order to design for a sustainable future ecosystem.

It is a well-established fact that design influences human behaviour (Fogg, 2009) (Lockton, 2010). Designers can consciously design products, services, and spaces in such a way that it facilitates the intended desirable change in users’ behaviour and eventually help them to sustain the behaviour change in a progressive manner. Service Design being a multi-disciplinary, human-centred, co-creative approach, can facilitate a holistic and practical outlook to behaviour change through its product-service systems. Design intervention approaches could be informed by ample of behavioural theories, principles and models from Behavioural Sciences to inculcate a sustained behaviour change. However, the designers and stakeholders need an appropriate actionable guidance to design interventions for a progressive behaviour change of users. Currently there are a few frameworks and toolkits available to guide the designers (Mumma, Robinson, King, Gardner, & Sutton, 2016), especially for designing services aimed at behavioural change (Mahamuni, Khambete, & Punekar, 2019).

CraftChange is a behaviour progression framework and toolkit (Mahamuni, Khambete, & Punekar, 2019) which intends to guide and facilitate designers to strategize, ideate and detail out design interventions for progressive behaviour change of users in a given context. In this paper we aim to evaluate the usefulness and effectiveness of this framework by applying it in one of our service design case studies explained further.

2. ‘CRAFTCHANGE’ FRAMEWORK

The CraftChange framework as shown in Figure 2, proposes a design intervention process from the perspectives of multiple stakeholders to progressively change user behaviour. The CraftChange framework is driven by the *Empathy Square* [Figure 1] where the four nodes represent different stakeholders– Service User, Society and Environment, Human Service Touchpoints such as Service Staff, and Service Provider Organization, for any given service-system and context for which Design for Behaviour Change is to be undertaken. The framework supports design interventions by addressing the concerns of all the four prime stakeholders in order to make design interventions more holistic and ecosystem based. Design can start from any anchor node and then move to the other nodes as shown in Figure 1.



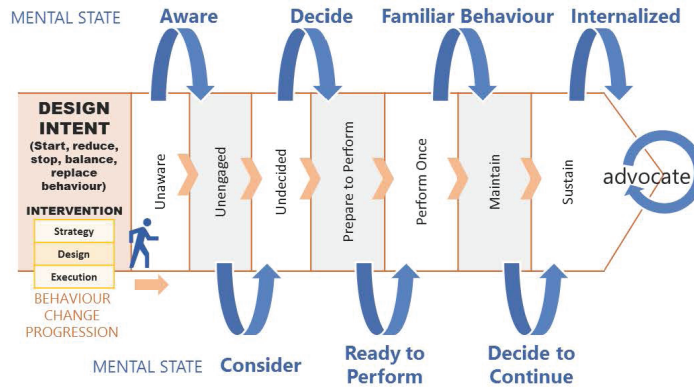
[Figure 1] CraftChange - Empathy Square (Mahamuni, Khambete, & Punekar, 2019)

Figure 2 also shows different mental states that the user goes through in the behaviour change process. A designer needs to ideate different sets of design interventions for each of the user’s behavioural stages from “unaware” state to “sustain” state.

CraftChange framework is operationalized through process, canvases and cards such as *Current Intervention Cards* for user research phase, *Ignite Cards* for ideation phase, *Challenge Cards* for validating and prioritizing ideas and *Enrichment Cards* for checking completeness of the ideas. Different kinds of cards are meant to provide design

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guidance based on the behaviour change principles. The said framework is undergoing initial testing and found to be promising. The work is in progress and would be published shortly.



[Figure 2] CraftChange Behaviour Progression Framework (Mahamuni, Khambete, & Puneekar, 2019)

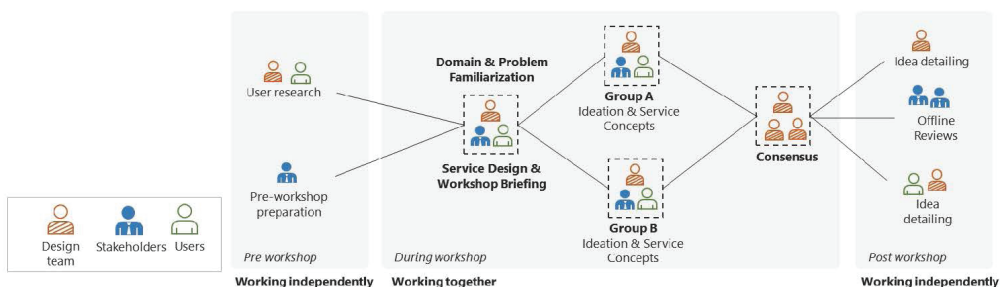
3. CASE STUDY – “ENCOURAGING PROACTIVE AND CONTINUAL DIGITAL LEARNING IN MULTI-CULTURAL SETTING”

We used CraftChange framework in one of our service design case studies, aimed at encouraging organization employees working in a multi-cultural setting, to learn proactively and continually using digital environments and revamp outlook towards learning. The latent intention of the design activity was to empower employees of a multi-cultural globally spread large organization, to enhance employee’s productivity and performance by offering personalized and adaptive learning services.

User research was done by the designers and design researchers to understand the concerns, constraints and aspirations of employees about learning. Existing interventions and initiatives were extracted to review the learning support offered by the organization. The key concerns derived through the user research are: Despite of a lot of training and educational digital platforms being available for the employees to learn, individuals focused on learning only when they were required to in the job, learning at organization was more of a compliance to the organization mandates rather than a proactive activity for gaining skills, the perceived importance of gaining domain knowledge was low among employees while they focussed on their existing areas of work expertise, time crunch during work hours was one of the distinct causes mentioned for not using the learning channels and platforms continually.

4. METHODOLOGY

The design activities were carried out in quasi-participatory (Mahamuni, Sharma, Lobo, Hirom, & Khambete, 2018) manner, as shown in Figure 3, where some of the activities like user research was done before the workshop by some of the participants. For the workshop, all the participants met together and got familiarized with the problem statement, service design and CraftChange framework. Then they were divided into two teams, wherein the teams worked separately on solving the problem. After the workshop, participants individually or within small teams developed the service components further, with the possibilities of engaging again as and when required.



[Figure 3] Quasi-participatory process

During the workshop aimed at ideation and creating solution service concepts, the two teams consisted four and five members each from multiple professional backgrounds - psychology, information technology, designers and design researchers. Incidentally all these team members were also the users of the service under consideration. One of the team members in each team played the role of the workshop facilitator. Facilitators also noted the observations during the workshop.

At the start of the workshop, service design overview was presented to both the teams together in order to

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CRAFT CHANGE: BEHAVIOUR PROGRESSION FRAMEWORK – EVALUATION IN QUASI PARTICIPATORY DESIGN SETTING

make them acquainted with service design. The CraftChange framework and the process was explained to the workshop participants. Further, the problem statement, the design brief and user research findings were discussed in details. The team was then divided into two ensuring trans-disciplinary participation in both the teams. The two teams simultaneously and separately used the behaviour change idea trigger cards and design ideation canvas to ideate under the guidance of facilitators.

The teams clearly spelled out the stated intention and latent intention of the service users along with the current and target behaviour of user. It was mutually decided that the team will first address the concerns of service users i.e. employees and then focus on other stakeholders as shown in Figure 1. The ideation was aimed towards identified employee target behaviour i.e. to inculcate proactive and continual learning behaviour among the employees, while also balancing other stakeholders' needs and concerns. The teams were familiarized with the concise personas created earlier on the basis of tacit knowledge (Mahamuni R. , et al., 2018) and refined with user research findings. The personas were – a bread earner persona from rural background, a confident and young persona considering life over work, an enthusiast niche skilled persona, a senior feeling monotony in his work and looking for a job or role change; identified through user research. The teams were allowed to choose one or many personas for the ideation.

For empowering the persona to progress from one state to another (as shown in Figure 2), a round of ideation session was carried out using one set of idea trigger cards from the CraftChange toolkit. From the user research, it was known that chosen personas intend to learn as and when required for their work, but the learning is not continual and proactive. Team 1 considered the scenario where the persona knows about the various learning services and resources provided by the organization and hence engaged in ideating for the subsequent progressive state of “maintain”. Team 2 chose the scenario where the employee is unaware of the learning services and hence intends to be in the behavioural stage of “unaware”. The cards were distributed within the teams to ideate for the given design brief. The cards were used individually by the team members and ideas were drawn on post-its. The cards were further rotated within the team and ideation was repeated using the exchanged cards. While using the cards, participants were encouraged to write their suggestions on improving the effectiveness of the content of the cards.

At the end of ideation phase, feedback was collected from the participants to know the effectiveness of the ideation process and the role of the cards. Participants appreciated the systematic ideation process and further proceeded with clustering of ideas. It was observed that though the teams initially focussed in ideating for the selected phase of the CraftChange Behaviour Progression Framework, ideas were also generated for other phases.

Then ideas were scrutinized for gaps in their relevance to the given user context, persona behaviour, and the concerns and constraints in purview of the other nodes of the Empathy Square. As a next step, the ideas were clustered based on their affinity to each other as a group exercise. Idea clusters like “Learning with Partners”, “Learning Lab”, and “Intelligent Learning Content Design” were valued to be innovative and effective, with respect to the other clusters for the chosen scenarios.

The selected idea clusters in both the teams were then detailed further using various service design techniques like offering maps, system map, touchpoint matrix, high level blueprint and journey map. This detailing of the idea cluster helped to connect the discrete ideas as one component service.

The detailed component services were further refined to implicitly attend to the various concerns, constraints and available resources of all kinds of stakeholders involved in its implementation. It was observed that the various component services were connected with each other to form a complete service.

5. OBSERVATIONS AND FINDINGS

Observations were noted by the facilitators of the two teams throughout the workshop. Oral feedback was also collected from the participants at intermediate stages of the workshop. The participants also made notes in pencil to provide feedback on the content of the cards in the toolkit.

The participants appreciated looking at the problem of continual learning from the lens of service, experience and behaviour change. Despite majority of the team constitution being non-designers and non-service designers, they were able to effectively arrive at a promising number and quality of ideas through the guidance of the framework and tools. Sharing behaviour principles and concepts with the team helped trigger rich ideas. This along with the framework and tools facilitated the team to think across the mental states of the users, from unaware to advocate. The combined ideas generated by the two teams exceeded 100 ideas within a span of around two hours. All mental states had sufficient number of ideas generated. The stages which had lesser ideas were revisited to add more ideas. The ideas generated were then clustered into three to five holistic and connected service concepts. Care was taken to revisit whether the ideas in the clusters were covered in service concepts.

The Empathy Square was seen as a useful construct towards balancing the concerns of the four stakeholders – the service users (employees), the support staff (HR, Learning departments, administration and other functions), the organization, and where possible appreciating the environment and society.

In general, it was observed that teams were able to use the guidance from the suggested process or deviate from it whenever needed. Participants liked the approach towards the problem as a behaviour change problem. None of the ideas were discarded. In fact, all the ideas were clustered to create meaningful service components and detailed

out to make it closer to realizable state.

Participants who were not involved in user research took longer time to understand the problem context. The workshop had provided a short period to showcase the current problems and constraints as findings from the user research to sensitize the participants. But it evidently needs more time and discussion to have all participants contribute effectively sooner. It was observed that participants who were part of user research were more active initially during the workshop as compared to others. There was also a time crunch situation seen during the period of detailing ideas. Here, a quasi-participatory approach seemed effective, where certain activities are done by part of the teams before and after the workshop. Mainly, here the user research was done before the workshop. The service concept clusters were further detailed and refined after the workshop too.

6. CONCLUSION

With the intent of evaluating the usefulness and effectiveness of the CraftChange Behaviour Progression Framework, we utilized it in a workshop setting to arrive at an effective service design solution to bring out sustained change in employees' behaviour towards learning, such that they proactively and continually learn. The participants of the workshop found the guiding process, canvases and cards to be useful in ideating and carving out innovative solutions for a learning service. The toolkit of canvases and cards were useful to trigger and channelize a large number of behaviour change solutions.

The Empathy Square provided guidance to focus on addressing the concerns of not just the employees, but also the concerns of staff that would be involved in providing the learning service, the concerns of the organizations, and where suitable the society and environment.

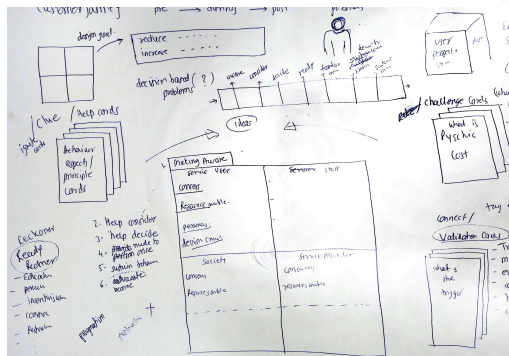
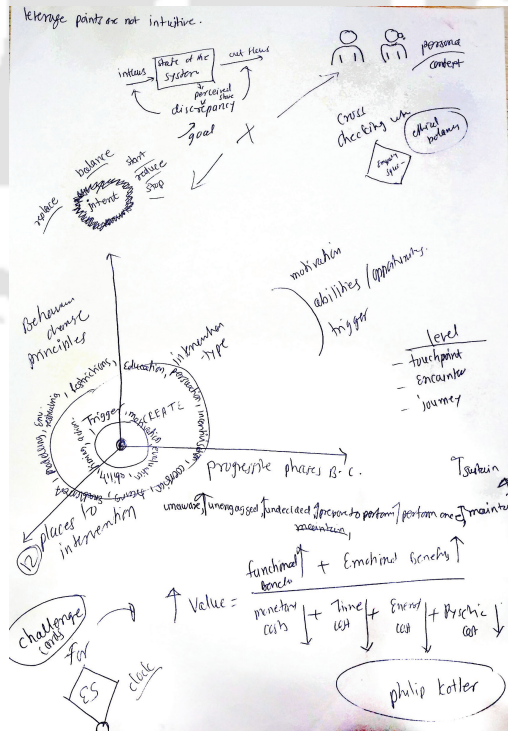
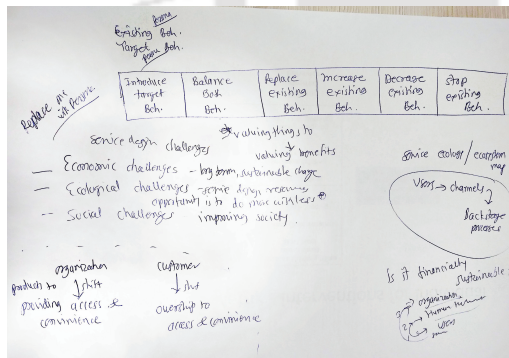
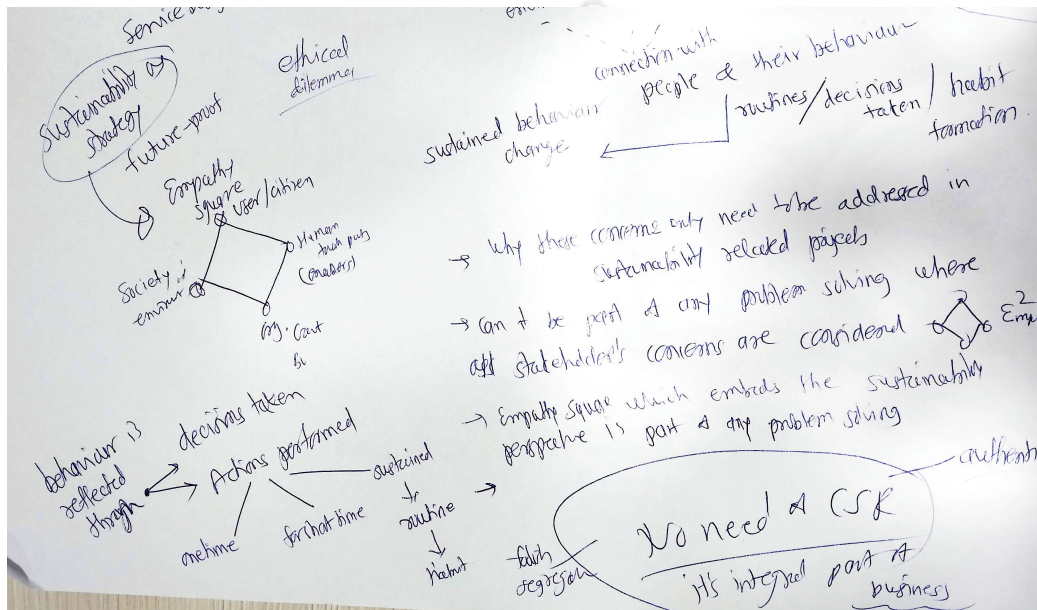
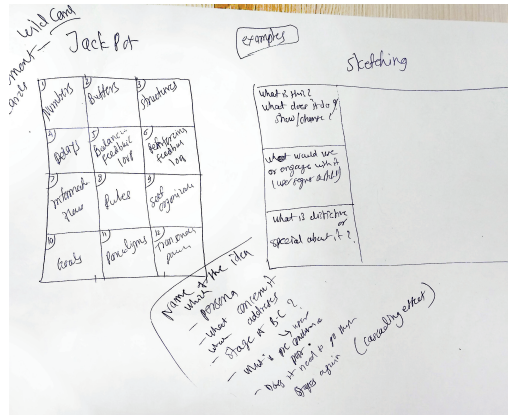
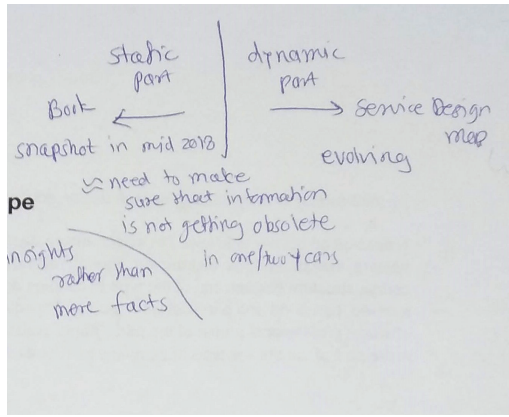
The CraftChange Behaviour Progression Framework [figure 2] provided a very structured guidance to the participants to think of ideas progressing systematically from a specific mental state (unawareness) towards sustained and internalized. Rather than thinking of the problem solutions from a high level perspective, the participants could now arrive at solutions which systematically take the user across the stages, from 'unawareness' (or other starting points) till 'sustenance'. This approach was found to be systemically informing and guiding the design intentions and interventions to achieve desirable behaviour change at individual and organizational level.

As evaluation of the process, few minor issues were noted such as communication challenges in the canvas and content, facilitating time, and team engagement and dynamics. With these inputs, we are in process of evaluating the framework further by also applying it on more number of small scale as well as large scale problems. Considering the usefulness of the framework, we aim at further improving the toolkit with findings from all the ideation workshops. In future, we intend to use this framework and toolkit for solving design problems in varied domains including public sector, private organizations, travel and hospitality etc.

BIBLIOGRAPHY

1. De Young, R. (1993). *Changing behavior and making it stick: The conceptualization and management of conservation behavior*. Environment and behavior, 25(3), 485-505.
2. Ellen MacArthur Foundation. (2015). *Towards a Circular Economy: Business rationale for an accelerated transition*. Ellen MacArthur Foundation.
3. Fischer, J., Dyball, R., Fazey, I., Gross, C., Dovers, S., Ehrlich, P., . . . Borden, R. (2012). *Human behavior and sustainability*. Frontiers in Ecology and the Environment, 10(3), 153-160.
4. Fogg, B. (2009). *A behavior model for persuasive design*. 4th international Conference on Persuasive Technology. ACM.
5. Lilley, D. (2009). *Design for sustainable behaviour: strategies and perceptions*. Design Studies, 30(6), 704-720.
6. Lockton, D. (2010). *Design with Intent: Influencing people's behaviour through products & services*. Made in Brunel: 250 Innovative Ideas. London: Papadakis.
7. Mahamuni, R., Khambete, P., & Puneekar, R. (2019). *Behaviour Progression Framework for Designing Sustained Behaviour Change*. Research into Design for a Connected World (pp. 39-50). Singapore: Springer.
8. Mahamuni, R., Khambete, P., Puneekar, R., Lobo, S., Sharma, S., & Hirom, U. (2018). *Concise Personas Based on Tacit Knowledge - How Representative Are They?* Proceedings of the 9th Indian Conference on Human Computer Interaction (pp. 53-62). Bangalore: ACM.
9. Mahamuni, R., Sharma, S., Lobo, S., Hirom, U., & Khambete, P. (2018). *Quasi-participatory service design in organizational context: A case study*. ServDes2018, Service Design Proof of Concept, Proceedings of the ServDes. 2018 Conference.
10. Mummah, S., Robinson, T., King, A., Gardner, C., & Sutton, S. (2016). *IDEAS (Integrate, Design, Assess, and Share): a framework and toolkit of strategies for the development of more effective digital interventions to change health behavior*. Journal of medical Internet research, 18(12).

Appendix 11



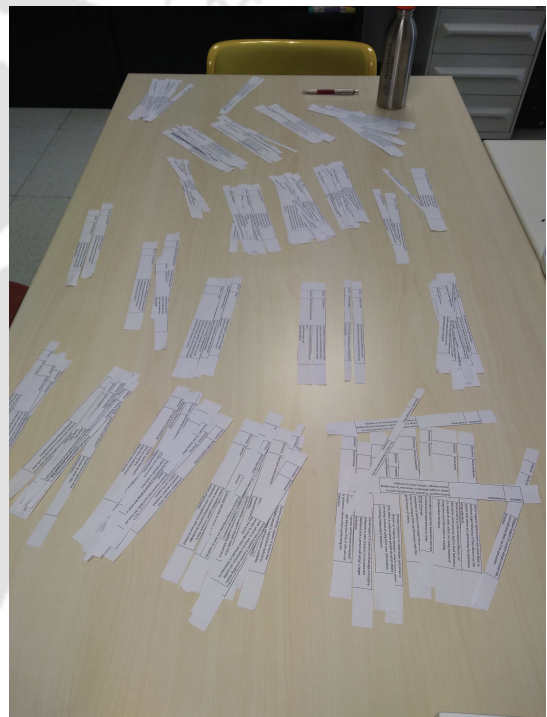
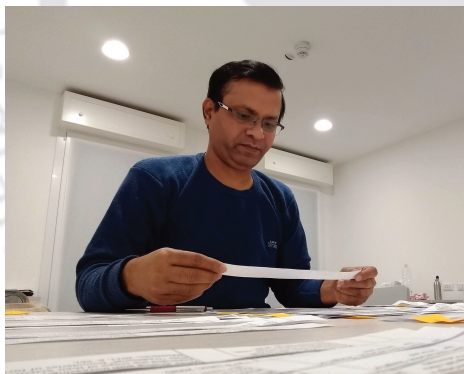
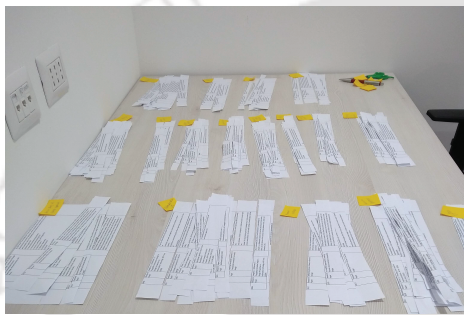
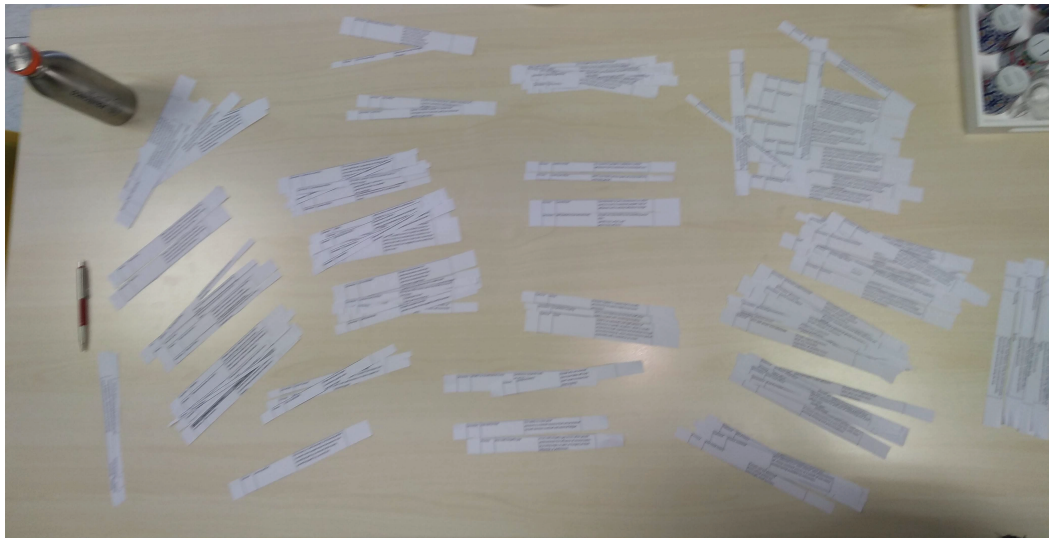
CraftChange Toolkit Conceptualisation

Appendix 13



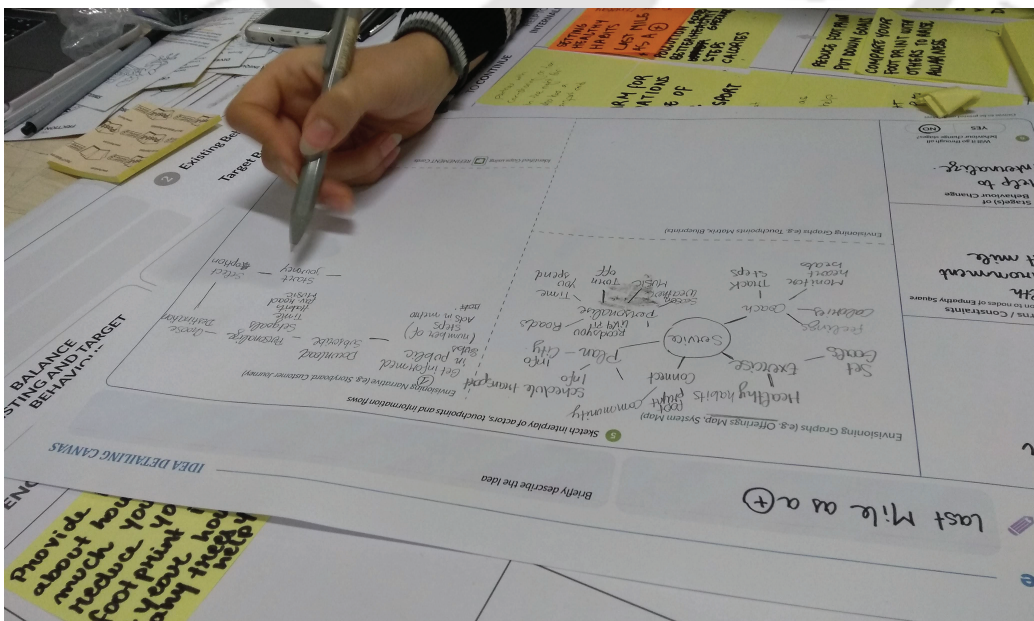
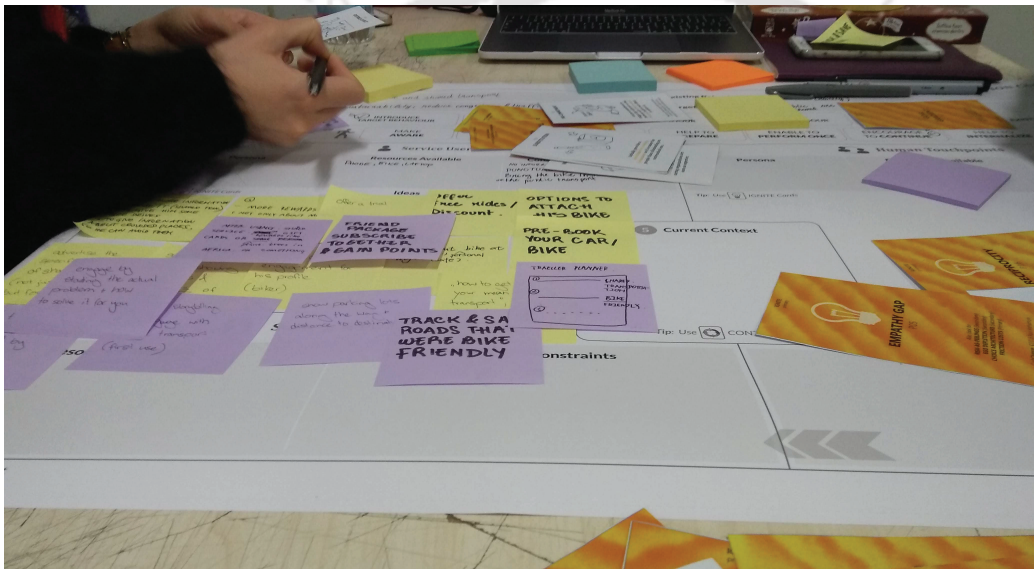
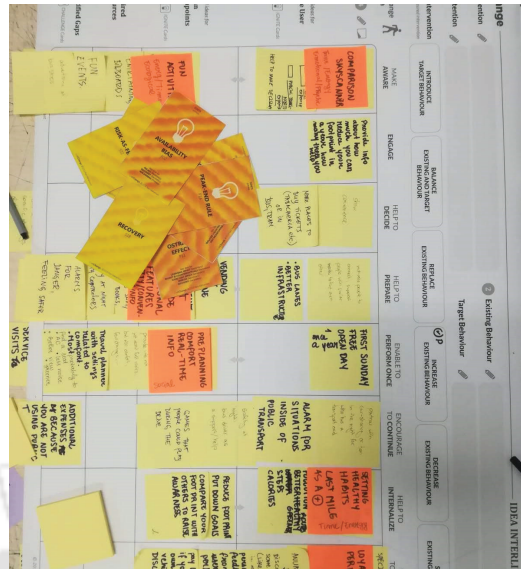
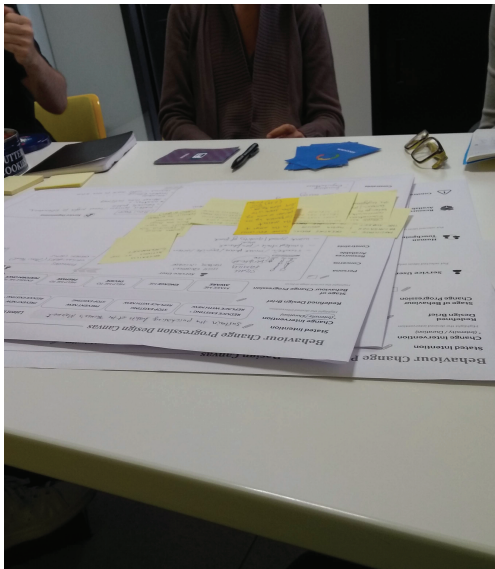
Workshop Preparation

Appendix 14



Clustering Concepts

Appendix 15

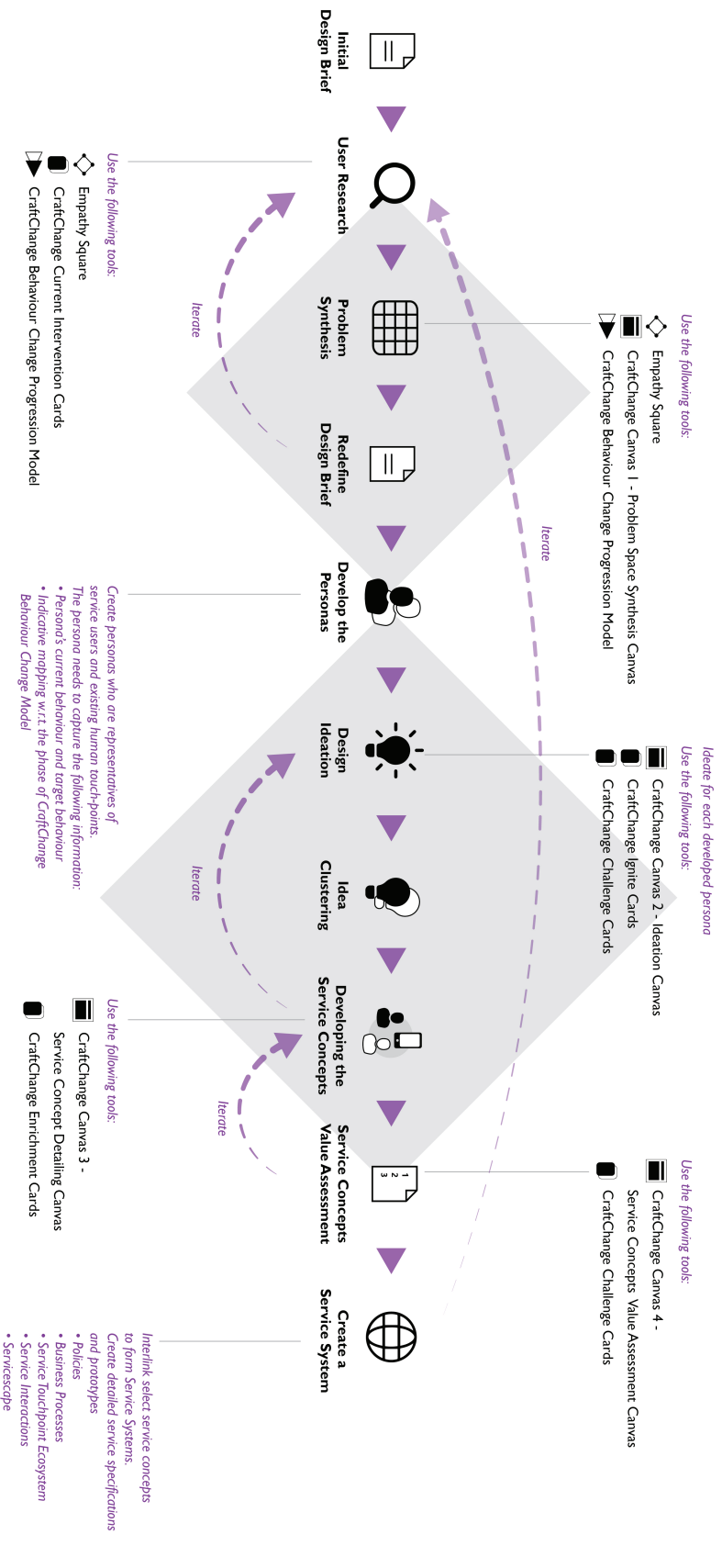


Service Design in Action

Appendix 16

CraftChange

SERVICE DESIGN PROCESS



Illustrated by Bhaskarjyoti Das

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Appendix 17

CraftChange — **CANVAS 1 - PROBLEM SPACE SYNTHESIS CANVAS** — Sheet ID

Project Brief / Initial Design Brief

Service User

Intent (Stated & Latent)	Concerns and Constraints	Resources Available
--------------------------	--------------------------	---------------------

Human Touchpoints

Intent (Stated & Latent)	Concerns and Constraints	Resources Available
--------------------------	--------------------------	---------------------

Service Organization

Intent (Stated & Latent)	Concerns and Constraints	Resources Available
--------------------------	--------------------------	---------------------

Sketch or note your insights from user research for all stakeholders

Current Interventions

- Persuasive Interventions
- Incentivisation Interventions
- Coercive Interventions
- Training Interventions
- Restrictive Interventions
- Physical Aspects of Environment
- Role Model
- Enabling Interventions
- Educational Interventions
- Leveraging Networking Interventions

Refer: CraftChange Current Interventions Cards

Stakeholder in Focus
Refer Empathy Square and highlight the box

Service Users Society & Environment	Human Touchpoint Service Organization	Users in Stages of Behaviour Change Progression Model <small>Map the number / percentage of users in each stage for the stakeholder in focus</small>
Introduce Target Behaviour	Balance Existing and Target Behaviour	Replace Existing Behaviour
Increase Existing Behaviour	Decrease Existing Behaviour	Stop Existing Behaviour

Behaviour Change Intervention
Highlight the desired intervention

UNAWARE → UNENGAGED → UNDECIDED → PREPARE TO PERFORM → PERFORMANCE → MAINTAIN → SUSTAIN → ADVOCATE

Redefined Design Brief


Canvas to be printed on ISO-A1 (33.1 x 23.47) sheet


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Appendix 18


CraftChange


CANVAS 2 - IDEATION CANVAS

Redefined Design Brief 

Name of the Persona 

Current Behaviour 

Target Behaviour 

Sheet ID 

 Ideas for Behaviour Change Progression of Persona  Generate Ideas for each stage using behaviour change trigger cards, e.g. CraftChange Trigger Cards

<input type="checkbox"/> MAKE AWARE	<input type="checkbox"/> ENGAGE	<input type="checkbox"/> HELP TO DECIDE	<input type="checkbox"/> HELP TO PREPARE	<input type="checkbox"/> ENABLE TO PERFORM ONCE	<input type="checkbox"/> ENCOURAGE TO CONTINUE	<input type="checkbox"/> HELP TO INTERNALIZE	<input type="checkbox"/> MOTIVATE TO ADVOCATE
<div style="background-color: #f9c79d; height: 100px;"></div>	<div style="background-color: #d9b4e0; height: 100px;"></div>	<div style="background-color: #f9c79d; height: 100px;"></div>	<div style="background-color: #d9b4e0; height: 100px;"></div>	<div style="background-color: #f9c79d; height: 100px;"></div>	<div style="background-color: #d9b4e0; height: 100px;"></div>	<div style="background-color: #f9c79d; height: 100px;"></div>	<div style="background-color: #d9b4e0; height: 100px;"></div>

 Challenge Your Ideas  Identify gaps, refine, and rate your generated ideas

<p>Functional Benefits</p> <p>How do you expect your idea to benefit the person?</p>	<p>Emotional Benefits</p> <p>How do you expect your idea to make the person feel?</p>	<p>Human Wellbeing</p> <p>How do you expect your idea to contribute to the person's overall well-being (Physical, Emotional, Social, Mental, Financial, etc.)?</p>	<p>Social Wellbeing</p> <p>How do you expect your idea to contribute to the person's social well-being (Social skills, Social relationships, Diversity and Inclusiveness)?</p>	<p>Monetary Cost</p> <p>How do you expect your idea to impact the person's financial well-being (Cost, Savings, etc.)?</p>	<p>Time Cost</p> <p>How do you expect your idea to impact the person's time (Time spent, Time saved, etc.)?</p>	<p>Energy Cost</p> <p>How do you expect your idea to impact the person's energy (Energy spent, Energy saved, etc.)?</p>	<p>Psychic Cost</p> <p>How do you expect your idea to impact the person's mental well-being (Stress, Anxiety, etc.)?</p>	<p>Ecological Integrity</p> <p>How do you expect your idea to impact the environment (Carbon footprint, etc.)?</p>	<p>Empathy Square</p> <p>How do you expect your idea to impact the person's empathy (Empathy towards others, etc.)?</p>
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Appendix 19

CraftChange

Service Concept Title

CANVAS 3 - SERVICE CONCEPT DETAILING CANVAS

Sheet ID

Briefly describe the Service Concept

Refer Craft Change Enrichment Cards to identify gaps and narratives, and identify gaps to further enrich them

TRIGGER	MOTIVATION	INFORMATION	ABILITY	TIMING	REINFORCING ACTION	FIVE SENSES	REALIZATION
Are there any prior triggers for this?	Is the persona motivated at this point to do this?	Does persona have all required information to evaluate and make informed decision?	Is persona capable to perform this? Is environment and/or system ready for this?	Is this/each time for persona to think and/or execute this?	Is this/each time or subsequent action? Can it be repeated to encourage repeat action?	Are five senses (i.e. sight, smell, touch, taste and sound) considered?	Are the following specifications details identified? Policy Changes, Business process changes, Touch-points, Interactions, Physical aspects of environment

Sketch interplay of actors, touchpoints and information flows

Envisioning Narratives (E.g. Storyboard, Customer Journey)

Envisioning Graphs (E.g. Offerings Map, System Map)

Envisioning Graphs (E.g. Touchpoints Matrix, Blueprints)

Stage(s) of Behaviour Change being Addressed

Make Aware	Engage	Help to Decide	Help to Prepare
Enable to Perform Once	Encourage to Perform Continue	Help to Internalize	Motivate to Revisit

Concerns being Addressed / Constraints being Overcome in relation to mode of Empathy Square

Actors / Stakeholders

Canvas to be printed on ISO A2 (23.4" x 16.5") sheet

Illustrated by: @shaharazad_bas

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Appendix 20

CraftChange

CANVAS 4 - SERVICE CONCEPT VALUE ASSESSMENT

Redefined Design Brief

Blank dotted area for Redefined Design Brief

Sheet ID

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Challenge your identified service concepts and competitively assign points on the basis of value generated. Scoring System: ▲ Low, ▲▲ Medium, ▲▲▲ High

Service Design Concepts	Functional Benefits	Emotional Benefits	Human Wellbeing	Social Wellbeing	Monetary Cost	Time Cost	Energy Cost	Psychic Cost	Ecological Integrity	Empathy Square
	Aim to increase it	Aim to increase it	Aim to increase it	Aim to increase it	Aim to decrease it	Aim to decrease it	Aim to decrease it	Aim to decrease it	Aim to balance it	For the module being addressed
	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Society & Environment
	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Society & Environment
	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Society & Environment
	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Society & Environment
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	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	▲▲▲	○	<input type="checkbox"/> Service User <input type="checkbox"/> Service Organization <input type="checkbox"/> Human Touchpoints <input type="checkbox"/> Society & Environment

