Design Thinking for Design Capabilities in an Academic Library

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Part I

“The problem fixes the end of thought and the end controls the process of thinking”

(Dewey, 1909)
Abstract

Design thinking has recently emerged as a powerful approach to innovation. Its ability to transform products, services, and organizations has been broadly discussed in the literature. However, how to implement the approach in organizational settings has not been sufficiently understood and addressed, especially when it comes to developing in-house design capabilities.

The emergence of disruptive technologies, changes in patrons’ behavior, and decreasing resources are some of the reasons that are forcing libraries to change. Libraries, like many other public-sector organizations, often depend on the engagement of external design consultancies to guide their transformational and innovation processes. When design consultancies conclude the work for which they were hired, the design processes implemented in the organization nearly always cease. The development of in-house design capabilities could empower an organization to more actively engage with transformational processes and sustain design-led innovation and strategy building over time. This thesis explores, both conceptually and practically, such processes in an academic library. The Research through Design (RtD) approach was used to design and implement a series of design interventions. They mostly took the form of design workshops. Each workshop combined previously learned concepts with new ones, as well as provided the tools and techniques to help integrate newly learned design practices with existing ones. All interventions were based on the real-life concerns of the academic library and, over time, contributed to increase of in-house design thinking capabilities.

The methodological approach, RtD, helped to formulate and allow discussion of a framework consisting of three inter-related components: temporal aspects, openness, and dialogical spaces. Temporal aspects focus on diverse time trajectories, including the time needed for organizational learning and the integration of new practices with the existing ones. Dialogical spaces, both physical and conceptual, help to maintain the posture of openness and create environments that are conducive to change. Finally, the thesis provides a set of guidelines that aim to help academic libraries develop in-house design capabilities using design thinking.
Introduction

During the past decade, libraries in general, and academic libraries in particular, have met a broad range of challenges. Academic libraries have been challenged, on the one hand, by the emergence of new technologies and devices (e.g., e-book readers and smart phones), digitalization (e.g., Google Scholar), and new ways of research and knowledge management (e.g., Research Gate). On the other hand, the patrons of academic libraries are often competent and early adopters of new technologies and digital tools and display an ever-increasing demand for good user experiences and solutions that support their dynamic work patterns, both in physical and digital environments. This situation requires paying continuous attention to the role of a library in an academic community, including consideration of the services on offer. In other words, academic libraries must be concerned with the vision and strategy for the future of their institutions, as well as develop innovative practices that allow them to be active and agile forces within the academic communities they serve.

Design thinking and designerly ways of working have recently emerged as good ways to innovate (Dorst, 2011), particularly to help libraries (e.g., IDEO, 2014; Meier & Miller, 2016; Vicente, Serrano, & Echevarria, 2017) develop new visions, strategies, and responses to dynamic challenges. However, how to implement and sustain design thinking efforts within an organization becomes a crucial question and represents an identified research gap (Carlgren, Elmquist, & Rauth, 2014, 2016; Rauth, Carlgren, & Elmquist, 2014).

In this thesis, I explore this gap by looking into the development of design capabilities in an academic library. In-house design capabilities bridge the gap mentioned earlier and support the ability of a library to sustain innovation efforts – to innovate products and services and the organization itself – using design thinking.

While ‘design’ and ‘designing’ have been long used in aesthetic disciplines, engineering, software development, and many other contexts, the term ‘design thinking’ has proliferated in the design research community since the publication of Rowe’s book, Design Thinking (1987). Despite its frequent use, defining design has
not been straightforward. Multiple interpretations and models that explain design thinking have emerged, based on different ways of understanding design, design practice, design theories, and also, the position and meaning of research in this area (Buchanan, 2001; Cross, 2006; Fallman, 2007; Kolko, 2014; Stolterman, 2008). While it is difficult to agree on what design thinking is, its multiple perspectives have been prized, and there seems to be a consensus regarding the most influential texts in this area. They are Herbert Simon’s ‘The Science of the Artificial’ (1969), Donald Schön’s ‘The Reflexive Practitioner’ (1983) and Nigel Cross’s ‘Designerly Ways of Knowing’ (2006), see Luchs et al. (2016). Common to these three foundational works is that elements of a designer’s way of thinking should be at the core of any profession, including the ability to critically evaluate design’s contribution to diverse professional activities. However, the eagerness to adopt and apply design practices in other fields creates a challenge – how do we do it?

One approach, as advocated in Luchs et al. (2016), seeks to present design thinking as a systematic and collaborative approach to identify and solve problems. It positions design thinking in the intersection of understanding the problem space and figuring out possible solutions within it. Thus, design thinking utilizes analytical thinking, in conjunction with intuitive and creative thinking, to get a deep insight into the context and propose solutions, see Figure 1. In this context, Cross states: “Problem framing, co-evolution, and conceptual bridging between problem space and solution space seem to be better descriptors of what actually happens in creative design” (2006, p. 92). Buchanan applied design thinking to tackle intractable problems that are

![Figure 1 — Positioning design thinking at the intersection of analytical thinking needed to reflect on and understand the problem space and intuitive and creative ways of solving problems (Image based on Luchs et al. (2016)).](image-url)
continually evolving (1992). He concluded that linear thinking cannot solve them, and that design is the way to mitigate complexities. Such problems – ‘wicked problems’ – had already been addressed at the beginning of the 1970s (Rittel & Webber, 1973). Design and designerly ways of working (Cross, 2006), and leveraging creativity, messiness, and uncertainty as their integral components, were appropriate means of tackling such problems.

Therefore, design thinking found its application in a range of different fields. Today, it is ubiquitously implemented in business as an approach to design innovative products and services, strategies for the future, and organizational changes (Brown, 2009; Liedtka, 2015; Martin, 2009). In the field of education, design thinking has become widely recognized as an approach to introduce humanistic perspectives when teaching science, technology, and engineering (Culén & Gasparini, 2019).

In translation from a design discipline to a different field, such as business, the design thinking process has been simplified, so that non-designers can understand it and benefit from its strengths. As mentioned, it has been communicated in different ways. Here, I outline a common, five-step model. As this model postulates, design thinking process moves through five stages: understanding the context and discovery of core issues within it, problem definition, ideation, exploration, and evolution. Through multiple iterations, this process seeks to propose innovative solutions in the context of companies and institutions outside the field of professional design. The approach was championed by the design consultancy IDEO and Stanford University’s d-school (“D.school,” 2016). IDEO has also developed a methodology geared explicitly towards the use of design thinking for public libraries (IDEO, 2014). Recently, there has been a call for librarianship to be understood as a design discipline (Clarke, 2017).

In my view, professional designers, or design consultancies, are necessary for IDEO’s approach to work. This observation, in conjunction with the belief that design can do a lot to improve the ability of libraries to deal with innovation, motivated much of my work, which is described in more detail in the next section.
1.1 The motivation for the research

As mentioned above, design thinking has become ubiquitous in business and praised as one of the best approaches to business innovation and organizational transformation. While success stories reported in the literature on the use of design thinking in organizations are impressive (Brown, 2009; Brown & Wyatt, 2010; Martin, 2009), a gap needs to be closed regarding how to put design thinking into practice in concrete situations and within particular organizations. While design has a powerful set of methods and tools for professional design practitioners and researchers, the development and use of designerly tools for other disciplines and non-professional ‘designers’ is lacking (Stolterman, McAtee, Royer, & Thandapani, 2009; Stolterman & Pierce, 2012). I noticed the lack of good methods, tools, and techniques, which could directly empower and engage end-users and librarians, as non-designers, in innovation processes, even before I started on my thesis research. As a result, I began my research by exploring existing tools, such as design cards, and how they could support non-designers to become familiar with design thinking processes and designerly thinking towards innovation (Culén & Gasparini, 2016). I had always believed that this familiarity would be beneficial, both in the situation of in-house innovation efforts and those led by hired consultancies. Later, in part due to the success of the initial design interventions that I conducted, my aim changed towards understanding and developing organizational design capabilities in academic libraries.

I have been an employee of the University of Oslo Library for over 20 years. I worked in digital services and witnessed first-hand how the library responded to external challenges, in particular, those of a socio-technological nature. Seven years ago, I started graduate studies in the field of Interaction Design. Through understanding designerly ways of thinking and working, I was equipped to look into how they could be implemented in an academic library. To start with, a library is not a design-oriented organization, but an organization with its own traditions focused on knowledge preservation and sharing. Thus, asking how such an organization could learn to use and integrate design elements as core components of daily practices presented an intriguing challenge. I was especially interested in the analytical and reflexive activities that designers engage in when entering a new problem space (Lurås, 2016;
Schønheyder, 2019), as well as how non-designers (in this case, library employees) could learn to perform such activities to help them envision solutions to challenges that arise in relation to products, services, strategies, and organizational changes within their libraries.

Furthermore, I believe that academic libraries offer a particularly compelling case to study at this point in time. Their resources are often limited, but their incentive to change and re-define their role in the academic community is high. I was, therefore, highly motivated to engage in exploring the opportunities that design thinking and design capabilities could offer for a sustained, ongoing renewal of academic libraries.

1.2 Research questions

The research presented in this thesis is explorative and experimental. It aims to understand how to best develop in-house design capabilities in an academic library. I sought to find best practices and adapt tools and methods to support the development of designerly competences, drawing on design thinking processes. In other words, I have used design thinking in its simplified form (as often applied in the industry), such as the five-step flow (Brown, 2009), to build familiarity with the process and designerly ways of thinking within the context of an academic library. At the same time, my research unfolded within the complex, messy, and uncertain process of understanding what building in-house capabilities entails.

The overarching issue that I am considering is:

**RQ**: How can we build and sustain in-house design capabilities using design thinking in an academic library?

This open, broad, overarching problem certainly does not have a well-defined or unique path towards a universal solution. I approached finding a solution to this question by engaging with four sub-questions. The first one presented an opportunity to inquire into organizational mindsets, values, and strategic intents to support the successful implementation of design thinking. The second sub-question deals with the design itself and seeks to answer how to make and use tools that can help library employees learn, accept, and integrate design thinking into their existing daily
practices. The third sub-question addresses communication in design teams. The fourth deals with temporal aspects of the design process and what is required to sustain design-led practices after the novelty of the approach wears off.

These four sub-questions are formulated as follows:

**RS-Q1:** *What is the main characteristic of the organizational mindset needed to successfully introduce and integrate designerly ways of thinking within an academic library?*

**RS-Q2:** *What methods, tools, and techniques best support non-designers (library employees) in integrating design-led practices into their everyday work?*

**RS-Q3:** *How can communication among team members be supported in design processes featuring non-designers?*

**RS-Q4:** *What are the temporal features of design thinking processes in organizations, such as an academic library?*

### 1.3 Research areas

As a library employee, or more specifically, a department of digital services employee, I have been engaged in work practices centered on existing and emerging digital platforms and services. Through the work of this thesis, I had to assume both the role of researcher and designer, and genuinely understand and work with multidisciplinarity. First of all, trained in interaction design within the Human-Computer Interaction (HCI) tradition, I expanded my focus beyond it to include design research and design practice, by engaging in Research through Design (RtD). RtD is a growing research area in HCI (Bowers, 2012; Dalsgaard, 2010; Gaver, 2012; Höök, Dalsgaard, et al., 2015; Koskinen, Zimmerman, Binder, Redstrom, & Wensveen, 2011; Stappers & Giaccardi, 2012; Zimmerman & Forlizzi, 2014). The HCI community engages with understanding design and the ways in which design processes and designed artefacts can produce and communicate new knowledge. This area of research also focuses on relationships between exemplars and more abstract patterns and theories.
To understand how to implement design thinking in a library as an organization, I also needed to gain knowledge of design thinking in organizations, business management, and strategy. RtD and design thinking in management constitute the main research fields that I drew from, as well as contributed to (see Figure 2).

Figure 2 — The fields of relevance for my thesis and the proposed area of my contribution.

HCI, as a multidisciplinary field focusing on interactions between humans and technologies, often adopts and assimilates what it needs from contributing fields, making it its own. RtD, however, remains distinctive in that it uses design research, theories, and practice as the main vehicles to inquiry and new knowledge generation. While RtD allowed interaction designers and design researchers to depart from the first two waves of HCI (Bødker, 2006) and their scientific orientation towards modeling human cognition, or focus on the user as a subject to be studied through guidelines, formal methods, and systematic testing, its early propositions did not articulate how to turn designerly reflections and explorations into a research method that is rigorous and documented well enough to be scrutinized and shared within the community. As expressed in (Höök, Dalsgaard, et al., 2015), early RtD also did not specify how to articulate the gained design knowledge, or allow design researchers to engage with and build on one another’s contributions. Recent efforts in RtD to establish explicit connections between theory, practice, and explorations, as discussed in (Fallman, 2008; Gaver, 2012; Höök & Löwgren, 2012; Odom et al., 2016), offered a validation of its own design practice, rather than exclusively focusing on user-centric methods, and critical and speculative opportunities (Auger, 2013; Bardzell, Bardzell,
These efforts made the HCI community quite interested in the opportunities that RtD offers. I found Fallman’s triangle (2008) to be a particularly valuable tool for communication and reflection during my work on this thesis, which involved drifting between explorations, implementations, and theoretical considerations. In Chapter 3, I discuss RtD and the design research triangle in more detail.

Design thinking in organizations grew from the translation of design and design thinking to the field of business, both management and strategy. It aims to increase an organization’s ability to innovate and create new benefits for its customers. It flourished after the publication of works by Brown (2009), Brown and Wyatt (2010), and Martin (2009). However, the early design thinking approach to innovation, as advocated by Brown, Wyatt and Martin, had a similar challenge to RtD: it lacked ways of articulating design knowledge in terms of theoretical concepts and good research practices that allow researchers within the field to build upon each other’s work – leading to the gap that my thesis addresses.

My work contributes to the field of design thinking in organizations by offering closer scrutiny of the three concepts that I identified as central for the development of in-house design capabilities: openness, dialogical spaces, and temporalities. These are detailed in the articles that form part of this thesis. Here, I only highlight a multilayered understanding of openness, not only as an organizational mindset, but also how the openness of design tools when used by non-designers emerged as crucial for the development of design capabilities. In terms of temporalities, looking at the trajectories of repeated participation, scheduling, and the pragmatic use of opportunities that emerge at the ‘right’ time, are all important. Dialogical spaces, both physical and conceptual, are essential for the ability of a library to sustain design-led innovation efforts. Figure 3 provides an overview of my research, including methods, findings and contributions.

However, the result that I am especially proud of is that my research certainly had a transformative effect on everyday practices within the University of Oslo (UiO) Library, where I work.
Figure 3 – Overview of my research.
I believe this change can be attributed, in part, to the research presented in this thesis. A practical consequence of the research and design interventions that were undertaken during the course of my studies has led to gradual and observable changes in the way people work. Today, my library colleagues use design methods as part of their daily practices in the form of new habits, such as new ways of sharing meanings, new knowledge, techniques, and competencies for different activities that they engage in. Sometimes, the design thinking approach and design practices are used to support in-house innovation efforts, for example, to create new services, but it is the everyday sense of interest and creative efforts of people that make a significant difference.

1.4 Structure of the thesis

This thesis is an article-based thesis, and as such, it is comprised of two parts:

Part I is a Kappe, the part of the doctoral thesis that describes the relationship between the articles and how they help to answer the overarching research inquiry.

Part II is a collection of seven articles that were published during the course of my research. Five of the included papers were published in the proceedings of international, peer-reviewed conferences, and two are journal papers.

I present the structure of the Kappe first, followed by a brief description of the content of the papers included in Part II.

Part I (Kappe)

The overall structure of the Kappe is based on a linear presentation of my research journey. The following chapters follow this one:

Chapter 2 provides a background on the context in which libraries in general, and academic libraries in particular, must change and a short overview of the areas of innovation that academic libraries around the world currently focus on. It concludes with a brief innovation context for the UiO Library, where my work took place.

Chapter 3 covers six themes that are all of relevance to my thesis. First, I provide background and relevant literature on design capabilities. A discussion of design
thinking in organizations, creativity, multidisciplinary and team-based approaches to problem-solving, service design, and innovation frameworks are then outlined, as these are central to my work. Literature related to these areas, especially work of relevance to libraries, is highlighted.

**Chapter 4** introduces theoretical perspectives, which are important to my work, concepts, and frameworks, including pragmatism, innovation, and practice. The chapter ends with a section focusing on the background literature of the core concepts relevant to my research.

**Chapter 5** focuses on the methods, tools, and techniques that I have used to address my research questions.

**Chapter 6** shows examples of the design interventions carried out. I present seven interventions in depth, highlighting, in particular, the aim of each, its setting, its duration, the methods and tools used, the procedure, and the outcome.

**Chapter 7** presents the analysis of my empirical study.

**Chapter 8** discusses the overall findings and their relation to my research questions.

**Chapter 9** presents the conclusions and implications of my research.

**Part II (Papers)**

The papers are listed in chronological order.


This paper describes the processes and tools that I have used to kick-start design-led activities in the UiO Library and introduce design and service design thinking methodology to UiO Library employees through a series of four workshops. A service design card set was used, enhanced by the additional cards that I designed to better fit the context of the inquiry. The cards
represented the touch points (contact points) between the library and its users. The paper addresses research sub-question RS-Q2.


The paper examines how design thinking methods and tools foster innovation when working in teams. The paper focuses on results from two workshops, where three design thinking software applications were used for teamwork. We found that moving from tactile experiences (such as those provided by cards) to digital ones shifted the attention to technical issues, which reduced the interactions between the team members. This paper provides a broader understanding of the mindset and tools needed to support design thinking activities. It relates to both sub-questions RS-Q1 and RS-Q2.


In this paper, we share the results of a qualitative study concerned with the use of methods and tools to support innovation activity in one of Scandinavia’s largest communication companies. The paper shows that team structure, creativity, and information flow are important for innovation. Furthermore, we highlight the importance of the tension between team members who have, and those who do not have, the competence to use the digital tools. The findings are relevant for sub-question RS-Q1 and point to what changes are necessary to achieve the mindset of openness towards design approaches.

This paper re-visits the use of design tools, such as design cards, canvases, and others, focusing on whether non-designers are better served by tools that are open-ended or structured. The findings show that semi-structured tools best support the creativity, number and novelty of proposed solutions. This paper relates to sub-question RS-Q2.


This paper takes a deeper look into how to foster innovation in an academic library through design thinking and the role of openness in this process. Different notions of openness are considered: openness to learning new skills, questioning, exploring and acquiring new values, and continually integrating what is learned with existing practices. While the paper predominantly addresses sub-question RS-Q1, it is also relevant to RS-Q2 and RS-Q3.


This paper discusses the importance of temporal aspects in complex design situations involving non-collocated, multi-disciplinary design teams. It brings forward three aspects: 1) the awareness of temporal trajectories in the process and how to bring continuity to an otherwise fragmented workflow; 2) the temporality of learning through such processes; and 3) a discussion of opportunities to improve design thinking by better understanding and integrating the temporal aspects of the process. As a research case, a project from digital humanities that aims to develop an innovative digital research platform was used. The paper addresses temporalities of design processes, that is to say RS-Q3.

This paper reflects on both practical and theoretical concerns around the building of design capabilities in academic libraries. It is a short version of the Kappe. It positions RtD as an appropriate methodological approach to building and sustaining organizational in-house design capabilities. The paper concludes with a set of practical guidelines to consider when building design capabilities.
The Research Context

2.1 Academic libraries at the vortex of change

Academic libraries present a particularly interesting case to study, as they find themselves facing significant changes, challenges, and questions relating to their function and position within the academic community. How academic libraries shape their responses and accommodate changes is bound to determine their future viability within institutions of higher education. However, higher-education institutions are undergoing transformations themselves to be able to better respond to growing societal challenges (Christensen & Eyring, 2011; Sarrico et al., 2016). Academic libraries, therefore, need to navigate troubled political, economic, technological, cultural, and societal waters, while finding themselves at the vortex of change. Perhaps the most significant factor for doing so successfully is sound strategic alignment with the overall strategy and goals of the institutions they serve. When these goals are not clearly defined, it is difficult to make appropriate decisions.

During the past few years, the future of academic libraries has been widely discussed (Bell, 2014; Saunders, 2015; Gayton, 2008). Many agree with Gayton, who expresses his skepticism about the future of academic libraries as follows: “The apparent death of academic libraries, as measured by declining circulation of print materials, reduced use of reference services, and falling gate counts, has led to calls for a more ‘social’ approach to academic libraries: installing cafés, expanding group study spaces, and developing ‘information commons’.” (Gayton, 2008, p. 60)

One observation that has emerged as rather definite is that academic libraries cannot rest on their laurels (Sennyey, Ross, & Mills, 2009). Rather, they have to be proactive agents of radical change. This implies an ongoing transformation, including the questioning of organizational vision and the role of the academic library in the 21st century university (Sennyey et al., 2009).

The New Media Consortium report (2017) illustrates the complexities of the challenges that libraries face. These range from new trends and technological developments that are likely to have an impact on libraries, to artificial intelligence
and deep learning, which are already starting to have an impact (Gasparini, Mohammed, & Oropallo, 2018; Pandey, 2018). These challenges affect the whole organization, at all levels, and include both the physical and digital spaces that academic libraries inhabit. I will briefly discuss a few more of the challenges facing academic libraries.

Understanding and predicting the uptake of new technologies and co-shaping between these technologies and the patrons of libraries, including practices that patrons develop with new technologies, is a major challenge (Bomhold, 2013). The rapid rate of technological changes also presents an ongoing challenge for academic libraries (Rice-Lively & Racine, 1997).

Academic libraries have always had enormous information competence to share with their patrons (Grguric, Davis, & Davidson, 2016). However, in a digitalized world, such competence is much less visible, and academic libraries are looking for ways to increase the visibility of the information they have, reach users online and continue to effectively share this competence.

Furthermore, academic libraries consider that increasing the information literacy of their patrons is still an important function to provide (Grguric et al., 2016). For example, it is important to teach new graduate students to distinguish between reliable and unreliable sources of information and how to evaluate resources. This has become even more relevant with the exponential growth in the number of open source journals, a large percentage of which cannot be considered to be reliable. In addition, fake news (Lazer et al., 2018) contributes heavily to the continued need for information literacy. Thus, the services that libraries provide (both in person and digitally) are still of huge value, but they have grown in complexity and the challenge is to design them well.

Curating knowledge through the acquisition and lending of academic materials is a centuries old tradition (Engelstad & Brandsæter, 2011). Since the very first academic library opened at the University of Bologna in the eleventh century, academic libraries have offered the sharing of knowledge. To do this always implied some development and incremental innovation, such as the customization of services towards specific
academic groups. However, considering the situation that academic libraries currently find themselves in, it is clear that the traditional, incremental changes that worked in the past no longer suffice. A more radical transformation is called for.

One of the possible directions for transformation points of the academic library as a physical space in an academic context (Lippincott, 2005; Simmons-Welburn, Donovan, & Bender, 2008). Traditionally, libraries have been, and still are, majestic buildings at the heart of institutions of higher education. However, their influence on the sharing of knowledge has diminished. Students and researchers resolve most of their information needs using search engines, such as Google Scholar or Research Gate, rather than walking into a library and asking librarians for the materials they need. Instead, academic communities now need spaces for meetings, discussions, group work, relaxation, and access to the resources that are not available over the internet. By removing bookshelves, academic libraries seem to be transforming into open spaces that support interactions and community building. The trend is particularly visible in new academic libraries that are planned and designed to be arenas for collaboration and knowledge sharing, rather than primarily depositories of knowledge.

What follows are three examples of academic library design done by the Norwegian architectural and design consultancy Snøhetta (2018). The Temple University Library in Philadelphia, USA is designed to “spark chance encounters” (Temple, 2018) by creating some interesting and novel zones, such as the immersive visualization studio and the innovation and creativity zone. The Ryerson University Student Learning Center in Toronto, Canada was conceived as a library without books. Instead, the environment supports interactions among learners, while also offering areas for self-controlled and introspective study. In the James B. Hunt Jr. Library for North Carolina State University in Raleigh, USA (2018), all books are stored in a large automated magazine, while the rest of the building is designed to support a variety of research and study activities. There is a visualization studio, a game design lab, a makerspace, a media production studio, and other high-technology spaces (Julian & Parrott, 2017). These examples demonstrate that physical spaces for new academic libraries are being
conceptualized in line with a contemporary understanding of their function: to enable cooperation, discovery, creativity, and innovation.

I have come to understand the physical space of an academic library similarly. It is a space for dialogue, collaboration, creativity, and an inter- and cross-disciplinary hub – a place to work together across boundaries, as argued by Mack (2012).

Through my work, I have learned to think of academic libraries as state-of-the-art environments that are cool, inspiring, and productive for the entire academic community. I did not start from such a position, but after working on my thesis, I have come to believe that such ongoing transformation is possible.

2.2 The University of Oslo Library

The University of Oslo (UiO) Library, see the main library building in Figure 4, which provided the context for my research, consists of 16 specialized libraries (after a recent reduction from 21) of different sizes, as well as the department of digital services, where I work. Collectively, they have approximately 190 employees. For the past ten years, the UiO Library has undergone constant re-organization. Re-organization processes, in conjunction with the overall UiO strategy, have brought the need to innovate to the forefront. Re-organization has affected both physical spaces and the services on offer by the UiO Library.

Problems with decreasing funding, lower demand for the loan of paper books, and new, competing online services have forced the leadership of the UiO Library to seek new paths through this complex landscape. The first paths that were attempted were related to end-user innovation. At the UiO Library, just before I started my doctoral studies, there were growing concerns related to creating positive user experiences and motivating users to take an active part in library innovation and renewal efforts. The UiO Library conducted user studies, mostly in the form of surveys, interviews, and focus groups. I participated in some of these efforts at that time (Culén & Gasparini, 2012, 2013; Culén & Gasparini, 2011; Gasparini & Culén, 2013). When I started working on innovation with students (end-users) through interaction design course projects, it attracted wide attention within the library and among the leadership.
In 2012, the user-driven innovation project and a project to develop a site to support Ph.D. students at the start of their careers (phd-on-track.net) were approved and officially kicked-off. After a couple of years of investing in this direction, its limitations became clearly visible. For example, students did not have sufficient knowledge of the everyday practices in the library or the back-end systems that their solutions need to comply with. Thus, the front-end innovation, while interesting, was not profound enough and could not affect everyday practices. However, a momentum was built to explore the various needs that need to be addressed and the opportunities that these needs create. The leadership and I have organized field trips to several libraries, including the libraries of the University of Cambridge and the University of North Carolina. The leadership were interested in how design-led innovation was used in these libraries, in particular, to develop new digital services. Seeing for themselves the results of applying design in these organizations, they were inspired and eager to learn more about opportunities for design-led transformations. This was an important step in ensuring an open mind to design-led innovation amongst the leadership. As design thinking was gaining traction at the time when I started my work, I took the opportunity to observe and understand if and how sustained innovation could be introduced and supported in the library. Thus, the contours of my research path became visible.
Since I introduced design thinking to the UiO Library, I have seen many everyday practices become influenced by either designerly ways of thinking, the use of tools, or new ways of communicating.

As the practice aspect is an important component of my work, I have briefly set out some of the work practices.

Understanding practices as routinized behaviors, I will begin by discussing the system of changing practices at the library. Changes in practices are often responses to external factors, for example, new technologies. One example of this is the occurrence of e-book readers. The UiO Library had to determine if readers were something that should be loaned out like other resources, or used in more profound ways, such as to place an entire course curriculum on the platform (Culén & Gasparini, 2011). However, changes can be brought about by internal factors, for example, structural reorganizations or the renewal of major services. Regardless of whether changes in practices occur because of external or internal factors, the approach to tackling them is similar. A change-causing factor is usually addressed by designating a workgroup tasked with understanding the scope of the possible change, the range of responses, and the consequences. When the workgroup has finished exploring the situation, it makes suggestions for actions, subject to the approval of the leadership. When approved, changes are initiated and put into effect by sharing the information gathered and the reasoning behind the workgroup’s conclusions at an employee meeting. New practices, if any, are proposed so they can be discussed. The minutes from employee meetings are always available, so the essence of changes is accessible to everyone at any time.

However, most of the time, business is conducted as usual through performing routinized, everyday practices. Some of the most important are set out below (there is no order of importance assumed).

As curating knowledge is still one of the main functions of an academic library, I first address practices related to curating. Numerous activities take place to ensure that users have access to properly curated resources. From the moment when a suggestion
to include a resource (physical or digital) into the library collection is received, a series of actions takes place. These actions may involve the evaluation of the resource, purchasing, receiving the order, registering it, indexing, cataloging, and, finally, finding a place for it. While some of these actions, and the practices related to them, are open to change, others must continue because they are at the very core of curating – for example, cataloguing (Engelstad & Brandsæter, 2011), although the way of cataloguing may change.

Simple *access-related practices* occur in the library when users need help to find and lend a book (desk service) or require access to journal articles online (purchase service for online access).

*Knowledge-sharing practices* are also part of work practices in an academic library. The library usually offers several types of courses in information and knowledge literacy to its patrons, teaching them how to devise good search strategies, organize bibliographical data, and understand the relevance of their library searches (Drachen, Larsen, Gullbekk, Westbye, & Lach, 2011).

On the other hand, academic libraries also have *coordinating practices*. These, for example, involve meetings with all the deans and the rector of the university to discuss and coordinate strategies and visions. These practices allow for an alignment of the library as an organization with the direction of the university’s development.

*Preservation practices* ensure that all the research implemented at a university every year, in the form of articles, books, or activities worthy of reporting on, is recorded.

*Communication and exchange practices* represent another set of important practices related to other academic libraries, primarily at the national and Scandinavian levels. These usually involve meetings at the leadership level, where common challenges are discussed and addressed, for example, how to make library services more visible or improve support for Ph.D. students. These practices also include the wide librarianship base, through participation in library conferences and field trips.
In these transformational times, *competence-development practices* are also important. In other words, ongoing competence building for all librarians is crucial (Jaguszewski & Williams, 2013). Libraries must consider the development of new skills, new working practices, and the knowledge necessary to meet the new requirements.
Background

This chapter discusses six inter-related themes that were foundational for my work. They are: 1) design capabilities; 2) design thinking for innovation and organizational change; 3) creativity; 4) designing in multi-disciplinary teams; 5) service-design thinking; and, finally, 6) how these themes support innovation and enable academic libraries to meet their challenges effectively.

However, I would like to begin with a few explanatory notes: i) the literature on design capabilities was sparse when I started; ii) in the section on design thinking for innovation, I address the topic only from my the perspective of my own use; iii) the creativity section reflects my understanding of the topic and the literature around it – I have used what is in the creativity section in practice, for example, when applying alternating thinking styles or choosing design teams; and iv) service-design thinking is part of the background because most of the interventions, especially at the start of my work, were service-design oriented. I now address each of these in turn.

3.1 Design Capabilities

As with design thinking, design capabilities have been subject to many attempts to define them, but efforts have resulted in no clear agreement on its definition. One approach, proposed by Moriati, Villari and Maffei (2014), was to consider the two words separately. The British Design Council (2013, p. 8) defines an alternative – “design as capability” when design “becomes part of the culture of public bodies and the way they operate and make decisions.” Other researchers consider design capabilities to be a concept central to design management, knowledge, skills, and methods, as well as design leadership (Malmberg & Wetter-Edman, 2016). In Rauth et al. (2014), innovation capability is seen as the preparedness of a firm to innovate, or its “muscles for innovation,” while design capabilities are understood to be the necessary design knowledge and skills to activate those muscles.

For the purposes of my thesis, I propose the understanding of design capabilities as being directly related to design knowledge, skills, methods, and tools, where the capabilities can develop over time. When acquired (at any level), they greatly help
with design activities, whether in professional or non-professional settings. Furthermore, design capabilities are affected by how and why those skills are used (Lin, 2014; Malmberg & Wetter-Edman, 2016). For example, solving relevant, real-life problems through design is a positive motivation (Culén & Gasparini, 2019).

Understanding how designerly ways of thinking (for instance, design thinking and service design) evolve into an organizational design capability is an under-researched area (Martinkenaite, Breunig, & Fjuk, 2017). Furthermore, scholars emphasize the need to focus on how design capabilities are sustained in an organization, after project activities end. Malmberg (2017, p. 218) observed that, after design projects end, participants are often not followed any further by the leadership, and no attention is paid to strategies that enable design capabilities to spread in the organization. This seems to be frequently the case when design consultancies are involved. It seems that opting for a set-up in projects, where skilled designers have learning-by-doing-based design workshops, does not support “sustained innovation capability through design knowledge” (Wetter-Edman & Malmberg, 2016, p. 3). Service designers, on the other hand, find that the design tools and methods they try to use in organizations do not produce “the kind of high-level transformational thinking in managers and others in the organization” that they had hoped for (Junginger, 2015, p. 217).

3.2 Design thinking for innovation and organizational change
I have chosen to study the design thinking approach to innovation and design capability building in the academic library. I have done this though an RtD approach described in the previous section and elaborated on in Chapter 4 and Paper 7. The approach is interesting because of its ability to support innovation using the cognitive style of designers, including creativity (Kimbell, 2011). Hence, design thinking has also become a resource for organizations as an agent of change (Stewart, 2011). The latter includes both business and managerial discourse (Lindgaard & Wesselius, 2017). The managerial way of using design thinking stems from the IDEO model (IDEO, 2017), as advocated by Tim Brown and David Kelly, among others. IDEO developed its ‘easy-to-use’ approach to innovation, which rests on human-centeredness, empathy, rapid prototyping, and abductive thinking. The approach has been used, tested, and
implemented by companies worldwide, with a number of impressive success stories, e.g., Brown (2009). Nevertheless, research on how to implement the approach is sparse and too often relies on anecdotal evidence (Lindgaard & Wesselius, 2017). To make the approach ‘easy-to-use,’ various techniques, tools, and methods have been developed, both by IDEO and others. However, companies that have adopted design thinking uncritically and further scaled down the approach into short training sessions (Dalton & Kahute, 2016), have mostly failed to innovate. This tactic has created a deep gap between the professional designers’ way of thinking in design and the over-simplified version of design thinking that has come to be frequently used in organizations and consultancy companies. In fact, Nussbaum criticized the latter form of design thinking: “From the beginning, the process of design thinking was a scaffolding for the real deliverable: creativity. However, in order to appeal to the business culture of process, it was denuded of the mess, the conflict, failure, emotions, and looping circularity that are part and parcel of the creative process. In a few companies, CEOs and managers accepted that mess along with the process and real innovation took place” (Nussbaum, 2013, p. 1). When discussing challenges in applying design thinking in industry, Carlgren et al. (2016) point out that design thinking has also fallen short because of: “… misfit with existing processes and structures; resulting ideas and concepts are difficult to implement; value of DT is difficult to prove; DT principles/mindsets clash with organizational culture; existing power dynamics are threatened; skills are hard to acquire; and communication style is different” (Carlgren et al., 2016, p. 16).

Figure 5 — Design thinking as an approach to innovation (Brown, 2009).
When I started working with design thinking, the preferred way to introduce and explain it to people outside of the design profession was based on a combination of three perspectives: the human one (desirability), the business one (viability), and the technical one (feasibility), see Figure 5. There was no prescribed way as to how to combine them: “Design Thinking is not a check list of protocols, instead it is a translatable practice framework that can be learned and embedded within the DNA of an organization” (Roberts, Fisher, Trowbridge, & Bent, 2016, p. 2).

However, as mentioned in the introduction, models similar to the five phases – discovery, interpretation, ideation, experimentation, and evolution were often used as a recipe to follow step by step when implementing design thinking. I will briefly outline this model, as it is represented in Figure 6. The shape used to represent the process illustrates how design thinking oscillates between divergent and convergent thinking modes, opening the inquiry and closing and scrutinizing the possibilities. One starts by trying to understand a given context and considers how to discover the true nature of the problem at hand, as well as identify possible paths towards a solution. Once these are understood and explored, findings are interpreted, and the problem re-interpreted. The creative task of exploring values and constructing meaningful concepts and ideas then begins. This often involves rapid prototyping as a form of experimentation and,
finally, defining the problem precisely, settling on a concept to pursue, and evolving this through the next iteration.

Schrage has noted that ideation and prototyping create a “playground” for conversations (Schrage, 2000, p. 170), an idea that is present also in the creation of dialogical spaces.

Finally, I wish to elaborate on empathy, which is often used in the discovery phase. Empathy has been mentioned widely in design thinking literature as an essential component of the process (Dalton & Kahute, 2016; Kolko, 2014). I have been intrigued by the notion of empathy. During my research, I experienced that stakeholders and the design process benefited from ‘stepping into a user’s shoes,’ finding out how they feel, or could feel, in a given situation, and helping them to understand the problem space. However, empathizing goes beyond this notion. It promotes a ‘keen’ state of mind where discovering insights of relevance to a user’s situation and understanding a user’s perspective ‘takes off’ and becomes enjoyable and a motivational force for participants in design efforts (Gasparini, 2015). Empathizing can be playful and fun when using methods, such as tracing user’s steps, role-playing, re-creating and enacting contextualized situations, and other activities. Empathizing can enlarge one’s viewpoints, not only cognitively, but also emotionally. In addition to understanding the supposed experiences of the user, other emotions can develop from the activities, such as joy, discovery, and comradeship.

The design thinking approach also supports the use of empathy to avoid flaws and cognitive biases that may occur during design workshops. For example, the ‘projection of own preferences onto others’ named the ‘egocentric empathy gap’ is described in (Liedtka, 2015), as well as a well-known ‘say/do bias’ (Liedtka, 2015).

Gaining experiences with empathy as part of the data gathering process has been helpful for my research, not only to align services and products with users’ expectations more effectively but also to help design team participants bond through interesting activities designed with empathy in mind.
3.3 Creativity

Creativity is a central component of design thinking. Coupled with messiness, ambiguity, and uncertainty, as Nussbaum (2013) pointed out, it is not an easy component to work with. One can choose from several different theoretical approaches to understand the human act of creativity. This theoretical pluralism includes ten different important perspectives (Kozbelt, Beghetto, & Runco, 2010), ranging from developmental and cognitive, to problem finding and problem-solving. The act of creativity needs to be self-discovered and self-disciplined (Shaughnessy, 1998), while a person’s “sensitivity to a problem” (Guilford, 1950) is a critical factor in finding or solving it. Design thinking relies on two thinking styles, often seen as the pillars of creativity – divergent and convergent thinking. In fact, both kinds of thinking are required to be creative (Cropley, 2006). During a design thinking process, both divergent and convergent thinking are enforced, and oscillation between the two supported. The divergent process requires a high degree of insight into the problem area and a willingness to shift perspectives, while the convergent process requires conscientiousness (Kaufman, 2013). Table 1 shows various attributes of divergent and convergent thinking.

<table>
<thead>
<tr>
<th>DIVERGENT THINKING</th>
<th>CONVERGENT THINKING</th>
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<tbody>
<tr>
<td>Being unconventional</td>
<td>Recognizing the familiar</td>
</tr>
<tr>
<td>Seeing the known in a new light</td>
<td>Combining what ‘belongs’ together</td>
</tr>
<tr>
<td>Combining disparate information</td>
<td>Being logical</td>
</tr>
<tr>
<td>Producing multiple answers</td>
<td>Homing in on the single best answer</td>
</tr>
<tr>
<td>Shifting perspective</td>
<td>Reapplying set techniques</td>
</tr>
<tr>
<td>Transforming the known</td>
<td>Preserving the already known</td>
</tr>
<tr>
<td>Seeing new possibilities</td>
<td>Achieving accuracy and correctness</td>
</tr>
<tr>
<td>Taking risks</td>
<td>Playing it safe</td>
</tr>
<tr>
<td>Retrieving a broad range of existing knowledge</td>
<td>Sticking to a narrow range of relevant information</td>
</tr>
<tr>
<td>Associating ideas from remote fields</td>
<td>Making associations from adjacent fields only</td>
</tr>
</tbody>
</table>

Table 1 – Factors relevant for divergent and convergent thinking.
The ten attributes of divergent thinking promote thinking outside of safe boundaries. This leads to a broader understanding of the problem area, and insights that are crucial to produce unexpected combinations of the known. Convergent thinking attributes, on the other hand, address the requirements to complete a creativity process. Here, fine-tuning and narrowing the set of ideas is necessary, and helps find a novel, viable solution to a problem. In addition to divergent and convergent thinking, creativity requires other specific cognitive abilities. Amabile (1983), points to domain-relevant skills, creativity-relevant skills, and task motivations as the three critical components of creativity. Domain-relevant skills include needed knowledge, talents, and technical expertise within the domain. Creativity-relevant skills depend on personal traits, among them self-discipline and self-control (Amabile, 1983). The last component, task motivation, builds upon the motivation to contribute to the process of change. Finally, creativity also depends on the space where the act takes place – it needs to be cared for and configured (Kristensen, 2004; Wycoff & Snead, 1999), so that it includes hybrid infrastructures for work, with a focus on soft factors, such as color and materials (Haner, 2005). With regards to activities within this cultivated space, playfulness is shown to be an important part of creative processes (Thoring, Luippold, & Mueller, 2012).

3.4 Designing in multi-disciplinary teams
Multidisciplinarity is another aspect of design thinking that many design researchers and practitioners view as central when radical innovation is desired. As can be seen from the creativity section, domain-relevant skills are needed, and design increasingly operates in new domains (Lurås, 2016). The diversity within a design team can ensure that the assemblage of knowledge within the team best supports processes leading to a successful solution. Furthermore, participants with diverse competencies do not affect team performance negatively (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). This observation was interesting to me. First, it helped me understand that collective intelligence depends on the composition of a team, so the team must be chosen with care. Second, it also shows the importance of “factors that emerge from the way group members interact when they are assembled (e.g., their conversational turn-taking
behavior)” (Woolley et al., 2010, p. 688). Thus, it is not only the knowledge that matters but also the way in which it is shared with the rest of the team.

Teamwork can also bridge scientific and designerly approaches, as suggested by Owen (2007). It has been argued that multidisciplinarity is particularly well-suited to foster creativity, even when team members are novices to design thinking (Seidel & Fixson, 2013). Nevertheless, multidisciplinarity brings more complexity to the process for the researcher: how to select teams, how to support a good team’s performance, how to take care of the diversity of cognitive styles among team members, how to support positive interactions, and additional facets of involving others in the design process (Lee et al., 2010). In my research I have come to regard 1) how to support mutual understanding and good communication and 2) learning from and with others as crucial challenges that I need to focus on.

3.5 Service-Design Thinking

An academic library is an example of a context in which services are both produced and consumed. New technological platforms enable users to consume most of these services at any time and place. For a library’s leadership, the management of services in this more complex digital/analogue context requires new skills. The question is how to holistically address the complexity of a service from the library point of view and from the point of view of patrons and other stakeholders. Thus, the relatively young field of service design, which has emerged over the last 20 years, has been of tremendous interest to libraries. Nowadays, service design is a mature and well-established field with three major areas of investigation: interactions, complexity, and transformation (Sangiorgi, 2009).

Service Design is often defined simply as the design of new services or the re-design of existing ones. It has existed, in practice, for millennia. However, the complexity of services and the problems they solve has grown. As a result, a comprehensive understanding of a ‘service domain’ is crucial when designing a service. Designing services is considered to differ from product design mostly through the act of doing the design (Polaine et al., 2013, p. 19). Edvardsson, Gustafsson, and Roos (2005) argue that a value is created during the consummation of a service, both for the provider and
the user (value-in-use). Digital services also offer the possibility to better curate relationships with users, who are now buying “offerings that render services” (Edvardsson et al., 2005, p. 111). My understanding of service design is in line with that of Schneider et al.: “Service design is an interdisciplinary approach that combines different methods and tools from various disciplines. It is a new way of thinking as opposed to a new stand-alone academic discipline. Service design is an evolving approach; this is particularly apparent in the fact that, as yet, there is no common definition or clearly articulated language of service design” (2012, p. 29).

‘User journey’ and ‘touch points’ (Polaine et al., 2013) are concepts that are widely used in service design. A touch point is any point of contact between a user and a service provider. A user journey is the representation of all the steps a user needs to perform to achieve the final goal of the service. A common example of a service is borrowing a book from the library. A user journey consists of a sequence of touch points that an individual user experiences when engaging with a service. For example, a user may start his/her journey online using a library system to find a book. The next step could be going to the physical library, talking to the person at the front desk, finding the book and checking it out using either the machine or the front-desk employee. If the book is then not returned on time, there may be an email from the library containing a reminder to return the book, and if the book is still not returned, late charges may apply. The contact points, such as the online system, physical library, and the front desk, are examples of touch points. Service-design methods are often based on re-design, deletion, addition, or combination of touch points in users’ journeys. In addition, various mapping techniques are often used. Service design utilizes visual communication methods and tactile tools, such as cards.

I also found the framework developed by Junginger and Sangiorgi (2009) appealing, as well as applicable to my work. This framework is based on the type of engagement that service design has in an organization. The authors propose three levels of engagement – core, middle and peripheral. The peripheral level would have only a marginal impact on organizational structure, as exemplified by product or service interface design (service interaction design). Such work, in general, does not influence practices or norms within an organization. At the mid-level, moving towards the core
of an organization, designers working with a service-design intervention need to challenge organizational norms and values. Hence, a designer needs to understand an organization and be able to ‘demonstrate the value of change.’ Finally, a service-design activity at the core of an organization, which aims to transform organizational practices and strategies, requires additional understanding of an organization’s structures and functionality. At this stage, a service designer needs to use “design inquiry as a conversation” (Junginger & Sangiorgi, 2009), with a focus on creating open and inclusive design activities. Overall, the framework explains why service designers should play the role of enablers, building capacities from within an organization.

In conclusion, this brief background on service-design thinking highlights the importance of understanding the possible effects of service design on an organization when working from within.

I acknowledge at this point that I have been very lucky to have had the opportunity to do my research in the context of an organization that I am familiar with. I am also fortunate that I could use service design at the mid-level from the start, and at the core level later on, working within the organization, aiming to build design capabilities, and helping to transform the organization.

3.6 Design thinking and service design research in academic libraries

The output of an extensive, systematic search in library databases, such as EBSCO, shows that a majority of journal articles advocates the use of design thinking for transforming academic libraries and librarians’ education, e.g., (Abels et al., 2018; Braun, 2016; Catiri, 2017; Mathews, 2012a, 2012b). Nevertheless, the actual use the ‘how-to’ of service and design thinking implementation in a library, did not result in many finds. Still, there are a few projects worth mentioning.

In the context of a large public library project in Denmark, Dindler, Eriksson, and Dalsgaard (2016) used design thinking to develop new library services and a set of design toolsets for the library. The paper reports on findings from an interview and an observation-based study, in which interviews were conducted before, during, and after
the project. The focus of the research was on how the results from design thinking efforts were (or were not) implemented in the library. The paper concludes that design thinking had limited effects on the organization, mainly due to the short-term involvement of external design teams (Dindler et al., 2016).

The work done to plan a new Australian academic library was reported in (Booth, Schofield, & Tiffen, 2012; Tiffen & England, 2011). Their way to include design activities in this process was to collaborate with the School of Design at the University of Technology, Sydney, which facilitated the use of a design thinking approach. Later, the sustainment of design activities was supported by an artist-in-residence and in-house designers (Luca & Narayan, 2016). One of the papers that triggered my interest in the design thinking approach in academic libraries was (Bell, 2011). Bell argued for the inclusion of design thinking as a subject in librarianship education. Bell and Shank (2007) also reported on the work done at the University of Rochester’s River Campus Libraries, by discussing the use of design thinking when a larger library renovation project was underway.

Using the service-design approach to innovate library services is more common. A paper by Junginger and Sangiorgi (2009) describes the importance of working with library employees. Using service-design methods to create service prototypes is quite common. For example, Trischler and Kelly (2016) report on service co-design with users from three different academic libraries in Australia. However, the activities stopped after the projects ended, in line with the observations from Malmberg and Wetter-Edman (2016). During planning for a new academic library at the Aalto University in Helsinki, an external design company was engaged (Rämö, 2014). Aalto University students and library employees participated in the design process, but only to inform the professionals. The new library did not pursue the use of service design or design thinking after the opening (Rämö, 2018). Another example of introducing design thinking and service design comes from Reed College in Portland, Oregon (Marquez, 2015). Design and service thinking were used over a period of two years and carried on by the team consisting of library employees and a group of users. The
paper demonstrates that service-design methodology offers a sound approach to control and analyze service delivery in academic libraries.

I have participated in several projects funded by the National Library of Norway, and have been part of a number of ‘design thinking in libraries’ conferences, for example, one at the University of Cambridge (UXlib, 2015) that gathered library employees from across Europe interested in design thinking. This has convinced me that there is more interest in design thinking and service design in libraries than the publications show.

While I have been able to mention only a handful of research papers, the situation is different regarding designerly tools. In particular, there are many design thinking toolkits specifically developed to support design thinking in libraries. IDEO (2014) is an example. The toolkit, which was developed by Dindler et al. (2016) through the above-described work related to services in the public library of Copenhagen, is available. Furthermore, toolkits for design thinking at libraries have been developed by Masaryk University (Zbiejczuk Suchá et al., 2015) and the British design consultancy Modern Human (2017). I have used these toolkits actively in my work.

Several projects mentioned in this section opted for external, professional design teams. One engaged an in-house artist and designer. They all address issues with the sustainment of activities after the work of the professionals is done. Therefore, the building of in-house design capabilities has the potential to address this problem. The toolkits have been useful during my research.
Methodology and Theories

This section begins with an explanation of the main methodological approach used in this thesis, Research through Design (RtD). I then outline other theories that have been helpful in framing the research: pragmatism, constructivist learning theory, and social practice theory.

4.1 Research through Design

In my work, RtD had a somewhat unconventional design outcome – I prefer to think of the entire collection of design interventions as a design outcome, e.g. developing in-house design capabilities at the University of Oslo Library. Of course, design processes of individual interventions also had design outcomes, often prototypes of services. While working on this series of interventions, I considered myself to be both a researcher and a designer (at times). As a designer, I usually made tools for workshops, from cards to maps. And I engaged in design activities as a member of a design team participating in an intervention. As a researcher, I meticulously and systematically prepared for interventions and documented the outcomes during interventions. I always had help with these tasks if multiple teams were involved. I have extensively used Fallman’s triangle (Fallman, 2008), as a reflection tool for myself, to help trace my engagement with different activities, such as design studies, exploration, or practice. It was also used as a communication tool when debriefing and reflecting on action after interventions, especially when several teams were involved, and we wished to trace differences and similarities in the processes that unfolded.

RtD is certainly not the only methodology that could have been used. Many researchers use action research, for example, which is a suitable alternative. However, the experimental quality, flexibility, openness, and focus on practice of RtD, as well as its continued insistence on reflection, were the characteristics that led me to choose RtD as the main approach.

RtD has its roots in design research. However, I learned about it as a Ph.D. student in the department of informatics, not design, and so I learned from Human Computer Interaction (HCI) researchers engaged in RtD as a research area within HCI. In HCI,
RtD emerged during the last decade (Bowers, 2012; Dalsgaard, 2010; Gaver, 2012; Höök, Dalsgaard, et al., 2015; Koskinen et al., 2011; Stappers & Giaccardi, 2012; Zimmerman & Forlizzi, 2014). First formulated by Frayling (1994) in the context of art and design, the RtD approach was rooted in the practice of art or design, rather than science. Frayling positioned the created artifact as the primary research outcome. While the works of Simon (1969), Schön (1983), Cross (1982), Frayling (1994), and Buchanan (1992) were still the central and guiding theoretical reflections within early RtD, current debates focus on its nature, legitimacy, and ability to communicate research knowledge gained by doing RtD in HCI (Fallman, 2007; Fallman & Stolterman, 2010; Gaver, 2014; Höök, Dalsgaard, et al., 2015; Höök & Löwgren, 2012; Stolterman, 2008). In particular, it is important to discern why RtD is not simply design research, design science, or interaction design (Cross, 2001; Fallman, 2007). While neither design research nor design science have to include design practice, RtD is deeply entangled with it, and only through it tackles new knowledge production. It is different from interaction design in that the output is not simply a marketable product or service but is new knowledge and insights that push the field forward.

As such, RtD is involved with design and research, with research meaning design research not scientific research. Gaver views science and design as being defined according to different and largely incommensurable forms of accountability: “Science is defined by epistemological accountability, in which the essential requirement is to be able to explain and defend the basis of one’s claimed knowledge. Design, in contrast, works with aesthetic accountability, where “aesthetic” refers to how satisfactory the composition of multiple design features are (as opposed to how ‘beautiful’ it might be). The requirement here is to be able to explain and defend – or, more typically, to demonstrate – that one’s design works” (2014, p. 142). Similarly, Owen (2007) describes the differences in constructing knowledge in science and design as follows: “Where the scientist sifts facts to discover patterns and insights, the designer invents new patterns and concepts to address facts and possibilities.” Owen (2007) also depicts the difference between how science uses theory and practice, versus how design uses them, see Figure 7. He highlights how analytical thinking in science constructs proposals based on an inquiry paradigm, builds that knowledge, and
then feeds it into the new proposals. In contrast, designers start with a real-world problem, then, using an application paradigm, build the knowledge through action and combining things and principles that work (synthetic thinking). Furthermore, in terms of processes, Owen (2007) makes a distinction between discovery and invention: discovery unfolds predominantly according to analysis, while invention unfolds according to synthesis as the dominant process. These processes are anchored in different needs or goals. Science seeks understanding, based on rigor and falsifiability, and measures its achievements by proving something to be, for example, true or false, or complete or incomplete.

In contrast, design seeks to find a form that is appropriate, effective, and fits culturally. It measures its achievements by the meaning it creates, its aesthetics and whether it works in real life. Owen also guides us towards the integration of science and design: “... a combination of science thinking and design thinking is better than either alone as a source of advice” (Owen, 2007, p. 22).

In line with Buchanan (1992), Cross (2001), and Schön (1983), RtD conceptualizes constructive design work as a designerly mode of inquiry into complex and wicked problems. Wicked problems are often interdependent and require an in-depth understanding of how the solution to address one area of entanglement affects other areas. All possible solutions, therefore, need to be considered within a local
perspective, but in balance with a holistic one, and with a deep understanding of the entanglements and effects that any proposed solution could have within the entire design context (Rittel & Webber, 1973). Yet, while taking a design approach to problem-solving, especially when concerned with wicked problems, there is no guarantee that two designers (or design teams) applying the same design methodology on the same design problem will produce the same result. It is, in fact, highly unlikely and perhaps not even desirable. Reducing the design process to a procedural how-to recipe negates the creative power of design to produce new, inspired, and unexpected designs in response to underdetermined (Stolterman, 2008), messy (Schön, 1983), and wicked (Rittel & Webber, 1973) design problems.

The role of theory in design processes remains ambivalent and debated (Bardzell, Bardzell, Forlizzi, Zimmerman, & Antanitis, 2012; Carroll & Kellogg, 1989; Dalsgaard & Dindler, 2014; Forlizzi, Zimmerman, & Stolterman, 2009; Gaver, 2014; Höök, Bardzell, et al., 2015; Rogers, 2004, 2012). Accordingly, the nature of the discipline is hard to pin down. Buchanan (2001, p. 17) asks: “What is the nature of a discipline that brings together knowledge from so many other disciplines and integrates it for the creation of successful products that have impact on human life and serve human beings in the accomplishment of their individual and collective goals?” He further states that design researchers are easily drawn into research in other fields. However, it is hard to evaluate the contributions of design research to other fields. The challenge, then, is to understand how designers move into other fields of work and return with results that are relevant for design (in both theory and practice). This challenge, crucial for design research and RtD, is also an issue relevant to my work, which is positioned and applied in the intersection of different research fields, and in an organization that had no design capabilities at the start of my work.

To enable communication and discussion around research through design, Fallman (2008) developed a tool: the Design Research Triangle, see Figure 8. Although the triangle was referred to as the interaction design research triangle to start with, it became a more general way of describing RtD activities.
Figure 8 — Design Research Triangle, adapted from Fallman (2008).

The triangle frames all work within RtD by three activities: Design practice, design studies, and design exploration. Each one of these “has its own purpose and intended outcome and the rigor and relevance have to be defined and measured in relation to what the intention and outcome of the activity is” (Fallman & Stolterman, 2010). Recognizing that research practices do not normally fall neatly into one of the three activities, but exist in the space between them, the triangle provides a way to address research practice through, for example, ‘drifting’ trajectories and looping and shifting dimensions. The following sections briefly address each of these activities.

**Design practice**

Design practice can be described as a generative and synthetic research practice where the researcher becomes an integral part of a multidisciplinary design team working on a real project, not primarily as a researcher or observer, but as a designer. That is to say, the researcher takes an active part in the hands-on design work of sketching,
constructing, and building artifacts and prototypes, dealing with time constraints, and communicating and negotiating with fellow team members, clients, and other stakeholders (Fallman, 2008). Thus, the researcher can build an appreciation and understanding of the tacit knowledge and competences involved in the professional design practice. However, unlike a professional designer, the researcher approaches the process “with an explicit design research question in mind, or with the clear intent of forming such a question from their activities” (Fallman, 2008, p. 6). The research question does not have to align with the direction and goal of the design project but can be formulated to focus on particular issues or themes that are relevant from a research perspective. In the context of an intervention, a design practice may aim to prototype a new service. However, my research aim may be entirely different and relate to, for example, the exploration of design tools, meaning creation, exploring how to shift thinking styles, etc., with the ultimate aim of supporting the development of design capabilities using design thinking processes.

**Design exploration**

Similar to design practice, design exploration is synthetic and proactive, involving the researcher in a reflective, hands-on process of exploring the design and construction of prototypes, artifacts, products, or services. However, rather than addressing the needs and requirements of a client or user, design exploration revolves around the researcher’s own research interests, where “the most important question is: What if?” (Fallman, 2008, p. 7) Design exploration intends to experiment, question, and provoke critical reflection on the current state of the world, and to imagine possible, alternative and preferred futures. “[D]esign exploration is a way to comment on a phenomenon by bringing forth an artifact that often in itself, without overhead explanation, becomes a statement or a contribution to an ongoing societal discussion” (Fallman, 2008, p. 8). In this sense, the artifact tackles the larger, more complex issues of human and social ideals, values, and notions. Design exploration can also be used in more traditionally oriented research, where design is used as a driving force in the research process, but where research interests are aligned with approaches to knowledge production: “[T]his is the case when the kind of knowledge and user experience
sought is the kind that cannot be obtained if design – the bringing forth of an artifact such as a research prototype – is not a vital part of the research process” (Fallman, 2008, p. 8). In this case, the explorations during my research were centered on planning, developing design tools for interventions, team assemblages, and learning, so that what was learned was re-enforced, and some new elements were then introduced, so that interventions remained motivating and engaging for the library employees. As mentioned earlier, motivation was also re-enforced by using different and current real-life issues at the library. Each intervention outcome was intended as a brick towards gaining more understanding and skills.

**Design studies**

Design studies is the type of design research activity “that most closely resembles traditional academic disciplines” (Fallman, 2008, p. 9), where the goal is to build upon and contribute to a cumulative body of knowledge. This requires an analytical engagement with design theory, methods, history, and philosophy, as well as the theories and approaches from a variety of other disciplines. It also involves presenting and publishing research outcomes in academic conferences and journals. “[U]nlike design practice, [design studies] seeks the general rather than the particular, aims to describe and understand rather than create and change, and because of that often appears as distancing to its character rather than involving” (Fallman, 2008, p. 9). Engagement with pragmatism and constructivist learning are examples of design studies in my work, but, through rigorous reflection processes, I was also able to see developing concepts that support the emergence and sustainment of design capabilities and are more important at the more abstract level than the interventions themselves.

**Trajectories, loops, and dimensions**

The role of the triangle, as mentioned previously, is not so much about the positioning of a particular activity, but the way in which it enables reflection and discussion about how an RtD researcher moves in between the three activity areas. It, thus, provides concepts that describe movements, such as trajectories, loops, and dimensions. Trajectories are either intentional or unwanted drifting between research activities. They enable discussion about the perspectives and direction of a particular research
activity, how the outcome of the activity may feed into another activity, and “what kind of quality measures, guarantors, and stakeholders we will face when moving in between different activity areas.” (Fallman, 2008, p. 11) Loops are trajectories without start and endpoints, signifying an ability to move freely back and forth between the two, and in some cases all three, activity areas. Activities in different activity areas, thus, feed into each other, iteratively driving the research forward. Finally, dimensions infuse the triangle with meaning by creating conceptual continuums and tensions between the activity areas.

One could ask: Why is the use of the RtD approach appropriate? I did not aim to produce a traditional artifact, understood as either a product or a service. However, I have approached my research question and sub-questions, as described in the design practice paragraph above, with the clear intention of performing designerly work while exploring those research questions and allowing for new insights to be gained by reflecting on activities during and between interventions, fully in line with RtD. My work could have been described as a collection of interventions, or a portfolio of diverse interventions (Gaver & Bowers, 2012). In this case, I could have annotated the portfolio, trying to bridge the gap between more abstract findings and concrete examples (Gaver & Bowers, 2012).

Figure 9 — Visualizer summarizing the discussion at a workshop during SMÅBIB project (Photo: A. A. Gasparini).
I chose a more traditional way to reflect in and on actions (Schön, 1983). In later stages of my work, I used a design visualizer (a person who represents discussions visually) to visually summarize discussions during the interventions, see Figure 9 (in Norwegian). This work was also helpful with my own reflections later on, as it represented the collective understanding to which I could then add my thoughts.

In summary, each intervention required that I engage in design practice when planning the intervention (for example, designing and making context specific card sets, or worksheets for the activities, thinking styles) and during the intervention (for example, rapid prototyping alongside other participants). Design exploration required that I, during planning, execution, and after events, focused on my research intent and critically examined the alternative designs and evaluated them in relation to their ability to support the building of design capabilities and organizational learning about design thinking. Design study then, in line with traditional understanding, contributes to the design research body of knowledge, by addressing how an organization, such as an academic library, develops design capabilities over time.

### 4.2 Pragmatism

A theoretical perspective that has inspired my work is pragmatism. John Dewey, a pragmatism and process philosopher, who has influenced my work, said “the most important factor in the training of good mental habits consists in acquiring the attitude of suspended conclusion, and in mastering the various methods of searching for new materials to corroborate or to refute the first suggestions that occur. To maintain the state of doubt and to carry on systematic and protracted inquiry—these are the essentials of thinking” (Dewey, 1909, p. 13). Dewey’s (1909) and Schön’s (1983) reflections on how we think have guided much of my epistemological effort to use reflective thinking, and support it by the methods, tools, and techniques suggested by Dewey and Schön, and, from my own field, Sengers et al. (2005). My understanding of pragmatism led me to seek to find ways to get things done, to be practical and flexible, rather than to follow a set of prescriptions, which was not my natural predisposition. I was helped by the work of others, notably Dalsgaard (2014) who recently connected pragmatism with design thinking. Dalsgaard argues that a
pragmatic approach could prompt a systematic understanding of a design situation. Furthermore, he points out that Schön (1983) and Buchanan (1992) explicitly draw on pragmatism to understand and transform design situations in practice, in line with how I worked with design intentions and RtD. The notion of ‘inquiry,’ in particular, governed my thinking about the practicality of making ideas real, or at the very least, making them ‘thinkable.’ “Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituents distinctions and relations as to convert the elements of the original situation into a unified whole” (Dewey, 1909, p. 108). This passage shows how one may ‘reframe’ complex, unclear, and uncertain situations into something that makes sense to a participant, and in which solutions start to take shape. In this way pragmatism cuts through theories and ideologies and focuses on what works in real life. In my case, in practice, this implied making sure that the interventions involved people with the appropriate knowledge, skills, and competences, and that we could together “consider the possibility and nature of the connection between the object seen and the object suggested” (Dewey, 1909, p. 8).

The process of inquiry has a certain familiarity with design thinking. Biskjaer and Dalsgaard (2012) describe the inquiry as an iterative process of: 1) recognizing that a situation is problematic – at the moment one starts an inquiry into a situation, the situation is problematized; 2) identifying the aspects or elements of a situation that make it problematic – not only at the surface, but at the core; 3) formulating conceptualizations of how a situation could be resolved – concepts and ideas that can resolve a problematic situation are abstract, yet meaningful and, as thought processes, part of the solution (Rylander, 2010); and 4) evaluating and testing to make a situation determinate and, therefore, solvable.

As can be seen, the phases of inquiry are closely related to the phases of design thinking, which often has an extra phase for experimentation (or rapid prototyping). Epistemologically, this implies that concepts and ideas have to be tested in real life to prove their validity and establishes the primacy of practice over theory. Furthermore, knowledge and theories can be viewed as “active phenomena that are formed and
Pragmatic inquiries, design practice, and situatedness are notions that are also extensively used by Schön (1983). ‘Situatedness’ explains how people, objects, and phenomena are contextually bound, a quid pro quo between them. When people, objects, and phenomena within a context do not work together, a so-called ‘indeterminate situation’ arises. Relations in such situation are unstable, unaligned, and difficult to understand (Dewey, 1909). An indeterminate situation can be resolved by creating better alignments within the context, in conjunction with ongoing renegotiations of what defines the context (Dourish, 2004). These notions, together with the notion of experience, are all well aligned with RtD.

Dewey considered an experience to be “a continual transaction between the individual and the environment” (Elkjaer, 2003, p. 483), including bodily sensations, emotions, and intuition (Elkjaer, 2003), which all support the learning processes and are crucial in establishing routinized behaviors or practices. It is these two aspects that I reflect on in the next two sections.

4.3 Experiential and constructivist learning

The application of design thinking in the library context also had much to do with learning and competence building. The approach to learning that I have implemented was based on real-life problem solving, through an experiential and constructivist approach pioneered in (Jonassen, 1999; Kolb, 1983). In fact, I re-discovered the Beckman and Barry (2007) model that combines design thinking, innovation, and learning styles, see Figure 10. The top image on the left shows different thinking styles. The design thinking process is shown in the bottom image, iterating between the synthesis and the analysis and the concrete and the abstract, when moving from an understanding of the context towards possible solutions. The large image on the right shows the integrated model, which also explains the thinking styles and explicates the relation to design thinking. One of the problems that arises in experiential and constructive learning, especially when it explicitly uses creative approaches, is related to a widely spread negative perception that many individuals hold regarding their own
ability to be creative. People often think that they are not creative enough and, thus, do not have the required ability to solve problems through either science or design.

However, Csikszentmihalyi, who has long studied positive experiences and creativity, has found that for many people, happiness comes from making new things, or making new discoveries (Csikszentmihalyi & Wolfe, 2000; Csikszentmihalyi, 2013). Recently, emotional learning has been recognized as important and directly related to the meaning-making process of the individual’s direct experience, and in relation to teamwork (Näykki, Järvelä, Kirschner, & Järvenoja, 2014). Emotional learning is a relatively recent concept, and I have not attempted to study it in organizations. However, my data shows that, in the context of my research in the library, positive experiences, coupled with the opportunity to perform creative tasks, have been important motivating factors for employees to take up new designerly practices.

4.4 Social practice theory
Practices are “embodied, materially mediated arrays of human activity, centrally organized around shared practical understanding” (Schatzki, 2005, p. 11). They have “some bodily and some mental activities, and ‘things’ and their use, a background knowledge in the form of understandings, know-how, states of emotion and
motivational knowledge” (Reckwitz, 2002, p. 249). Shove, Pantzar, and Watson (2012) deconstruct practices into three constituent elements: materials (e.g., things, bodies, infrastructures, ecologies of artefacts), competences (e.g., know-hows, ways of feeling) and meanings (e.g., shared ideas, purpose). They argue further that specific configurations of these elements, with minor variations at the time of performance by a community, constitute what is commonly referred to as a practice. A practice in a specific context is known as ‘a practice as performance.’ In their work, Kuijjer et al. (2013) point out how communities narrate and share these instances of specific configurations and re-configurations as informal stories, and use them to learn from each other and change practices, leading to new ones that are known as ‘proto-practices.’ Based on this, Pandey (2015) considered the following practice elements as important for developing proto-practices at a library: 1) bodily performances; 2) creating a crisis of routines; and 3) generating a variety of performances. These elements support the re-configuration of images, and skills, leading to the emergence of proto-practices.

Bodily performances

Bodily performances are ways in which the body learns routines and performs and evolves them. Active bodily performances are used to integrate the new and the already familiar elements easily.

Crisis of routine

Crisis of routine (Reckwitz, 2002, p. 255) refers to situations in which a change in the elements of practice leads to adaptation, improvisation, and experimentation. This leads to practice performances involving completely new elements and, consequently, opportunities to change existing practices. Kuijjer et al. (2013) suggest that crisis of routines should be designed and staged to allow for the emergence of proto-practices.

Variety of performances

Crisis of routine, unless repeatedly performed by a community of practice, is perceived as an exceptional situation. To re-configure practice-as-entity, a variety of
performances need to be introduced, so that a community can develop different kinds of adaptations and improvisations, allowing for multiple sets of similar narratives.

I inquired into (through a series of interviews at the start and towards the end of my work and after I had completed it) and observed everyday practices in the library, as briefly outlined in Chapter 2. In interventions, I used bodily performances – the interventions always involved moving, not just sitting around tables – provided opportunities for varieties of performances, and enabled crises of routine, if possible.

Two aspects of practices are particularly interesting for this work. First, elements that are part of an ongoing social practice are naturally linked together, while, when these links are broken, the practice dies (Shove et al., 2012). Second, practice theory places the role of the artefacts used in design (design tools) and the final output (prototypes/artefacts) as central objects (Kimbell, 2009) in design practice. Together, these two aspects point in the direction of what the sustainment of design capabilities needs to entail: 1) the integration of design practices with existing ones, linking them together effectively, so they are not easy to break; and 2) tools are very important for linking the elements of practice and shaping the design outcomes. Tools need to reflect the existing design practice (Stolterman et al., 2009), so that their users can be “involved in constituting and reproducing practices” (Shove & Pantzar, 2005, p. 62).

Brown and Duguid (2001, p. 40) state that “working, learning, and innovating are interrelated and compatible and thus potentially complementary.” Although innovation, work, and learning are often considered to be conflicting activities in an organizational context, when viewed from the social practice theory point of view, they become complementary. Kuijer and colleagues (Kuijer, 2017; Kuijer et al., 2013) argued that drawing on practice theory offers a novel approach to solving complex design problems. Taking practices as a unit of design, instead of products or services, offers a better way to tackle complexities, understand relations between design, artefacts, and users. “…[P]ractice theory does not offer a model that explains human action according to a set of causal relations and factors (Kuijer& Bakker, 2015). Rather, it offers a conceptual framework to give a ‘general and abstract account’ (Schatzki, 2001) to gain understanding of a particular topic” (2017, p. 3).

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Methods

In this section, the methods used in my research and design practices are briefly outlined.

5.1 Charting the territory

As mentioned in Chapter 2, the initial efforts to innovate at the University of Oslo Library were focused on engaging end users in innovation processes (Gasparini & Culén, 2013). Gradually the focus shifted to the organization, as I noticed that employees – even though their daily work practices normally do not include design – were interested, engaged, and empowered by designerly ways of working, design tools, and teamwork. For example, the interaction design course offered some library-related projects, and library employees (in large numbers) used their own time to join in and work with student teams.

Before I engaged the library employees in design thinking, I had a lot of data on end-user driven innovation, collected by supervising several interaction design student projects for the library. Since I believed that end-user driven innovation would be the main focus of my thesis, I started my research by conducting in-depth interviews with ten library employees (leaders and others) and five students. The intention with the interviews was to help me understand how the library thinks about design and innovation – particularly end-user innovation in light of recent challenges that the library was experiencing – and how they thought these challenges could be resolved (note: design thinking was not part of the established vocabulary at the time, so no questions were related to design thinking).

The interviews were transcribed, and I started the analysis using Hyper-transcribe software. To capture the nuances and gain a comprehensive understanding of the content, I listened to each interview again during the analysis. Emergent coding was used, and I also used a research diary to aggregate all the data. The idea was to conduct a new set of interviews two years later and ask similar questions. However, as is often the case with research, the focus of my research shifted a few times. Thus, although the second set of interviews with the library leadership was conducted as
planned, the questions had less relevance to my research as will be explained in Chapter 7 of this thesis.

As interviews, see (Crang & Cook, 2007), may not be sufficient to uncover all relevant contextual elements, additional data was gathered using ethnography-based approaches, such as active and passive observations of how decisions regarding innovation are made in the library and document analysis (mostly from leadership meetings where strategies, including innovation, were discussed). As a result of this inquiry, I decided to introduce design thinking and service-design seminars first, and later engage in the design of interventions.

5.2 Exploring designerly methods, tools, and techniques

To involve employees directly in innovation efforts through design intervention and increase the chances for design thinking to take hold – considering pragmatism and design practice (Dalsgaard, 2014) – I decided to try solving two challenges in parallel: 1) design artefacts and 2) design activities or actions that bring artefacts to life. This dual challenge became my definition of a ‘design intervention.’

Design interventions

Design interventions grew organically out of the rapid, iterative prototyping that is part of the design thinking process, as a way to better communicate, understand, and predict reactions to designed artefacts, the opportunities for their use and the use itself. The design activity that brings a product to life can be enacted at different levels, starting from storyboarding or scenarios to putting outcomes into real-life use, something that could be done at the library. They became the main methods for me to work with design capabilities.

My role in these various design interventions varied. In some cases, I was an observer during interventions designed by others (for example, Pandey, my colleague and also a PhD candidate whose work was related to the design of libraries). In other cases, I was the intervention designer, and engaged in the design process during the intervention and afterwards in post-design activities, such as observations covering the use and possible needs for additional services or adjustments to designed artefacts.
The interventions themselves had diverse forms and utilized different tools and techniques, depending on what they aimed to achieve. Seminars and events were used to communicate, share knowledge, and raise awareness around design thinking. Hands-on design sessions usually took the form of design workshops and used a variety of design methods, such as brainstorming, sketching, visualization, Giga-mapping prototyping (Sevaldson, 2011), modeling, role-playing, theater, and many others.

**Seminars (sharing knowledge)**

Four seminar presentations, with the goal of introducing everyone in the library to the design thinking approach, were held at the start of my research. Seminars lasted about an hour. My preferred way of conducting seminars is an interactive presentation format (two-way communication during presentations) for approximately 45 minutes that presents concepts and the process flow of design thinking and service-design thinking, with many examples, followed by open discussion. The audience consisted of employees of different branches of the library and, in one of the seminars, the library leadership. After the seminars I collected informal feedback on what intrigued and engaged the audience and I tried to identify places where more information could be given. Questions and comments from the audience during the discussion were also important for planning ahead.

**Design workshops**

Design workshops were one of my main ways of doing interventions and engaging others in hands-on work with design thinking. They were either standalone activities or activities organized as part of larger interventions (short projects). Preparing for workshops required contact with the library leadership and other relevant stakeholders. Physical meetings with interested parties were held ahead of a workshop to discuss plans and for me to understand their challenges. The tools, materials, and technologies required for the workshop were always tested prior to the actual workshop. Then an agenda and a detailed plan were prepared and shared with the leadership and other stakeholders. This gave me an opportunity to establish communication channels prior to the workshop with those that would be involved in design efforts. In this way, I
could try to note how they communicated and what their mindset was like. Although carefully planned, the workshops always allowed for deviation, keeping workshop participants, goals, and expectations as a higher priority than the plans. Sometimes, plans included tasks that the participants had to prepare prior to the workshop. Although this had the potential to make the workshops more efficient, I found that people usually did not want to put in time beforehand, no matter how interesting the proposed tasks were. After each workshop, however, people often continued working with the tasks, expending and applying them on their own situations and needs. A debriefing regarding the experience with the activities and outcomes of the workshop took place after each workshop. All comments were noted. In this way, I had the opportunity to improve the activities, as well as to know when I needed new ones.

I was not always free to choose the workshop participants from within the library (I could always choose expert outsiders, as is clearly described in Paper 6). After all the interventions related to my PhD work had been carried out, I realized that almost all the University of Oslo Library employees, at all levels, had participated in at least one of the workshops. Many had participated several times, and some chose to gain competence in design thinking to the level where they became new organizers of design thinking workshops. They became design knowledge brokers (Pandey & Srivastava, 2016).

It took some time to discover the ideal length of a ‘typical’ workshop. These efforts to optimize time and gains from such workshops resulted in a one-and-a-half-day model for more serious challenges, in which participants spent time outside of the usual workplace (if possible), and two to three hours for simpler ones. To ensure that all participants had a basic knowledge of design thinking and service design, every workshop started with a brief presentation of the main points related to them, followed by the planned design tasks. While working, the participants were always divided into task groups in such a way that those with less experience could learn from those with more experience.

To document my work, I made a folder for each intervention, see Figure 11.
Each folder contained a plan for one of the interventions, reflections, and the documentation of the implementation of the intervention in the form of hand-written notes and photo-documentation. Figure 11 shows some of the intervention folders and, at the bottom, an open folder containing materials for the PhD-on-track intervention with pictures taken during the design activities and printed out (1), hand-written, in-situ notes (2), reflective notes written post intervention (3), and, finally, all the design tasks planned for and used during this intervention (4). These materials were used both
to reflect on the outcomes of a particular intervention and to look at the developments over time. Whenever I thought that I saw patterns, I would look into the folders again. Whenever I observed new practices taking root as a consequence of some intervention, I would add notes.

This process is not new and has been described by Schön (1983) as a way that design practitioners gain new knowledge through critical reflection, either in action, as a conversation with situations, or on action, see Figure 12.

Schön also emphasized how designers reflect on conversations they have with the design settings, taking into account all the stakeholders and their mental models of the situation. Of course, the context and the internal mental model that designers have is also a part of these conversations. Reflections were the main method of focusing on the dialogical spaces and temporal aspects of the process of gaining design capabilities.

Figure 12 – Reflections on and in action, based on Schön (1983).
Tools

Tools are among the first examples of human design. They can be viewed as material and cognitive extensions that augment our abilities to carry out specific design tasks. Which tools are appropriate depends on the task at hand and many other factors, among them a researcher’s preferences and the level of expertise. In the beginning, I almost exclusively used service design cards, while towards the end of my research a much broader repertory was at my disposal, including workbooks, digital tools, design probes, and diverse mapping methods. Cards, Giga-mapping, and semi-open templates are described below, as they contributed effectively to positive communication, making dialogical spaces, and changing practices.

Cards

Cards are tangible objects with certain characteristics that set them apart from other tools for design. First of all, they represent a familiar way of engagement, often with positive associations from early life and games. They do not necessarily require any technology (although several apps with design cards are available). The transparency of content representation (visual immediacy of what is on the card) and movements (manipulation with cards while in use) make them suitable as shared objects for collaboration. Cards can be used to introduce new information, elicit information, inspire, and more. Consequently, they can be used in all phases of a design process, from initial ideation through ongoing concept development to evaluation. In the light of the discussion in the introduction, it is easy to see how they can facilitate both syntheses (e.g., re-combining individual cards to create new ideas) and analysis (e.g., categorizing and assigning values, meanings, and interpretations). As design thinking processes are nearly always conducted in teams, the approach needs to be inclusive of all team members in order to be effective. Everyone participating in the process should be active and interactive (with other participants). Cards create an opportunity to establish a dialogue with others, through which a common language and understanding among the team members is shaped. This is essential for the team to address and solve problems together.
In Wölfel and Merritt (2013), the authors describe a study of 18 different card-based tools through which they try to understand how these benefit designers and design processes. Their efforts resulted in the identification of five dimensions across which the examined card tools differed. They were:

1) The intended purpose and the scope of cards (general purpose, such as method cards, or context specific, such as inspiration cards)
2) The duration of use and placement in the design process (at any time or for specific phases of the design process)
3) The system or methodology of use (the same set of cards can typically be used in several different ways, e.g., forced association with a specific card, or card sorting according to some criteria)
4) Customization (many sets require no customization, while others offer an option to select features)
5) Formal qualities (related to what is depicted on the cards, e.g., text, image, or both).

In general, when considering a new design project a design team chooses the tools as well. If cards are chosen, the team can decide whether they like support for analytical thinking or synthesis. The team can also choose to use an existing card set, or make a new one, see (Culén & van der Velden, 2015). It is not frequently mentioned in the literature that multiple sets of cards can be used during the design process. Actually, sets that support analytical thinking and sets that support synthesis may work well in combination, in particular for teams with less experience.

Apart from making my own cards for some of the design workshops, I tested a wide variety of existing sets. This was especially interesting when working with people who were new to design thinking. I have observed that cards facilitate mutual learning and help increase creativity in design processes. They are also useful in explorative sessions, interviews, design fiction, future wheels, etc. The downside of cards is that they shape the conversation, and it can be difficult to take conversation away from what the card-set defines as a discussion theme. In preparation for a design workshop
at the library, I used all opportunities to test different card sets and ways of using them. Below I have set out one example of such an exploration.

I was invited to hold a design thinking workshop abroad. I used the opportunity to set a research goal for myself: to explore the use of different card sets to understand how best to use them during a workshop to shift between synthesis and analysis towards easier integration of these ways of thinking. Four different types of cards were used, see Figure 13. Two of these were of the same kind, namely design-method cards made specifically to facilitate design thinking for libraries and support analytical thinking. The first one was a LibDesign set (Zbiejczuk Suchá et al., 2015) consisting of 35 cards, each presenting a method from one of the four categories: learning, analysis, design, and testing. One side of the card gave a visual overview of the method, followed by its written explanation. The other side contained a step-by-step process of applying the method. The second set, designed by Modern Human (Modern Human, 2017), was similar. It also had 35 method cards addressing immersion, inspiration, imagination, and invention. The third set of cards was an AT-ONE set (Clatworthy, 2011). Each card of the set represented a touchpoint between a service provider and a user, using an image and a word to represent touchpoints, e.g., email, computer, smart phone. The set, apart from touchpoints, contained six method cards, inspiring different ways to use the set. The last set of 110 cards was from Design with Intent (Lockton, 2010) supporting synthesis. The set was organized into seven perspectives, covering architectural concerns, error-proofing, interactions, a ludic lens, a cognitive lens, (a)-symmetry, Machiavellian lens, and, finally, a security lens. Fourteen participants took part in the workshop, see Figure 14. They had diverse disciplinary backgrounds (librarians, people working with archives, researchers, and professional designers). Some had previous experience with design thinking processes, but many were coming to the workshop to learn about the approach. The participants were divided into four groups, and each group was given a different design brief, unrelated to my research concerns, to be addressed using two sets of cards, one that supported synthesis and one that supported analysis. A four-step design thinking process was used (inquiry, ideation, definition, and prototyping).
During this three-hour workshop, participants were able to experience the phases of a design thinking process, learn how to use cards and undertake Giga-mapping to inquire into the contexts of their brief. The participants were able to create meaningful prototypes and solution proposals, see Figure 15, which demonstrates the power of the approach, particularly for novice designers. Based on what the participants said, as well as what I could observe during the workshop, the teams that used method cards first had a more positive experience with both sets of cards.
These teams used the cards during the entire ideation and definition phase of the design thinking process. Switching to the second set was easy. However, when teams started with the last two sets, and then switched to method cards, the flow did not feel as natural, see (Culén & Gasparini, 2016).

In summary, if method cards are used in combination with other sets they should be used first. The cards for synthesis eased dialogue building among team members.

**Giga-mapping**

As with cards, I have actively explored different mapping techniques, such as affinity mapping and mind-mapping. However, a newer technique, Giga-mapping (Sevaldson, 2011), was the one that was the most interesting to work with. Giga-mapping is an extensive mapping process, addressing multiple layers and scales and scaffolding the ability to investigate relations between objects, observations, knowledge, and imagination.
The map gives an overview of system complexities, allowing for insight into the correct problems to solve. Giga-mapping is often a time-consuming task. Its key principles are: 1) map out all the aspects of the problem that you see; 2) any details can be relevant; 3) avoid hierarchies, but include all the layers; 4) write and draw, talk less or later; 5) use colored makers or other visual differentiators; and 6) avoid post-it notes until analysis.

Giga-maps, like cards, are visual and accessible to all. By mapping extensively and broadly, it becomes easy to observe the boundaries of the problem space. The lack of linearity and the messiness of the mapping process points towards it supporting synthesis better than the analysis, and thus, designers may prefer this method compared to non-designers, i.e. those not trained in the use of synthesis.

**Semi-open design templates**

Semi-open templates, see an example in Figure 16, were designed by Pandey (2018). They exemplify the work that is not mine, but I could explore what they do in the context of design interventions, long before the findings were published. The work aims to minimize the use of commercial tools, including cards, to support deeper empowerment, self-generated, and arrived at content, and as a result of it, a new kind of design practice in libraries. In line with Pandey, I opted for the use of more loosely defined methods that foster openness, understanding, and deeper learning, contextualized in participants’ own work practice and supported by semi-structured templates for guiding, rather than prescribing, actions. Our joint paper (Paper 4 in this thesis), together with other co-authors, describes how we used the semi-structured templates to explore the effect of the closeness versus the openness of tools in a design situation.

In summary, the appropriate design tools enabled the slow mixing of usual work practices with design practices, leading to the emergence of proto-practices. This process required some time to become visible. It is now common for normal discussions at the library to ask for magic moments, or for people at meetings to Giga-map.
Sketch the story of your product and service in action.

Like any good story, this has a beginning, a middle, and an end. The middle is usually the magic moment, and where you should start your thinking and sketching.

But the end of a good story is the beginning too, and the end is equally important.

Figure 16 — Example of a semi-open template (Frilux).
Interventions and Reflections

In this chapter, I describe in more detail seven of the sixteen interventions that I carried out in the context of my research. They engaged leaders and employees of the Science Library, the Law Library, Digital Services and the Communication Department of the University of Oslo (UiO) Library. Some interventions, in addition to the library employees, also engaged other departments at the University of Oslo, within humanities and Life Sciences, or another library. The selected interventions are representative of different phases of my research, see Figure 17 showing the timeline, and can be categorized as:

1) *Early interventions*. There were four interventions (represented by green squares on the timeline) in this category, two of which are described in this chapter in more detail – the Science library and the Open-Access. All four interventions were similar in complexity, actions and duration. They were intended to motivate the UiO Library employees and leadership to learn about design thinking as a way to innovate products and services, as well as to engage them ‘hands-on’ in design processes.

2) *Mid-period interventions*. Nine interventions that were part of this phase (represented by blue squares on the timeline) had the growing complexity and the increasing relevance of intervention tasks for the University of Oslo library in common. The period was also marked by active explorations and observations of changes in daily practices within the UiO Library as a whole, as well as in specialized libraries or departments that engaged in these interventions. Again, two interventions are selected as representative for the phase: the Law library intervention and the Web editors intervention.

3) *The strategic interventions*. The last two interventions can be described as strategic (marked in dark red) and they are both described in this chapter. They represent highly complex projects, dealing with strategies for the future of the UiO Library.

4) *The knowledge-transfer process*. This intervention (the orange square) involved the Kyambogo University Library in Kampala, Uganda, and it is different than the others
in that it called for communication of the process to others willing to implement design thinking to innovate and gain design capabilities.

Before proceeding with descriptions of the selected interventions, I relate the above-mentioned intervention phases and the research output (the papers that comprise Part II of this thesis).

1) Early interventions

The Papers 2 and 3 present research into the use of tools and methods for innovation more generally. Of course, I used the knowledge gained from the research done for these papers to reflect on the choice of tools and methods that could work well for the first interventions at the UiO Library. The choice fell on the approach that was described in Paper 1 – working with relatively simple service design tasks, using service design cards as a visual tool.

The service design tasks for these initial interventions were heavily influenced by what I learned and experienced while supervising student projects in an advanced interaction design course, where students could choose to work on projects that were proposed by (and related to the needs of) the Science library. The Science library became a special place, a living lab of sorts, for innovation. Subsequently, it also became a situated context for many of my initial explorations. The student projects had an important influence on openness and willingness of the whole UiO Library to consider design thinking and in-house innovation. It is for this reason that I have
chosen to highlight it here. Among the four interventions during the early phase of my research, the Open-Access intervention also stands out. It helped me to understand how design thinking can be applied in cases of rather narrowly defined problems, which was in contrast to the other interventions that had a more open, explorative character.

2) Mid-period interventions

The nine mid-period interventions focused on services, but also tackled more complex issues that were of importance for the specific library at the time that the interventions took place. At this point, some library employees were interested in and actively engaged in working with and learning further about design thinking. It could be argued that they became design thinking knowledge-brokers (Pandey & Srivastava, 2016).

In this period, I have actively experimented with tools and reported on the findings regarding the structure of the tools in Paper 4. Although the mindset of openness was important from the start, I have through explorations and interventions during this period understood better the significance of different layers of openness and described them in Paper 5.

Two interventions from this period stood out in terms of their importance for my research. First, the Law library intervention, in addition to being a more open inquiry, brought awareness of temporal issues to the forefront. It was the first intervention that used the day-and-a-half time span that later became common practice. My focus turned intently on how to organize activities and their order and determine the duration of each activity to best utilize this dedicated time, as well as justify the resources spent on building these new design capabilities. Second, the web editors’ intervention was the first one in which I tried entirely different ways of working, using only templates and mapping. It tackled the complex problem of sorting out how web editors from different libraries work, and if there were grounds to introduce common processes when editing. The focus of this intervention was on communication and safe and open spaces for sharing (dialogical spaces) understandings, challenges, ideas for solving them, knowledge, skills and more.
3) The strategic interventions

The last two interventions were related to large, complex, and long-term projects, which are ongoing. The interventions were strategic and deeply engaged in envisioning the role of the UiO Library in the future. They were also different from each other. The first one, the Tebtunis project, probed into the possible future model of the academic library as a knowledge hub, connecting researchers from different disciplines into multidisciplinary teams – in this case researchers in humanities, which Paper 6 presents in detail. The second one, the Life Science intervention, demonstrates the conscious and strategic use of design thinking to re-image the academic library in the future building of a new Life Science department, and to position itself centrally in this context.

4) The knowledge transfer intervention

The intervention in transferring design capabilities and design thinking to the Kyambogo University Library was included because the set of guidelines that is the outcome of my research is closely related to this intervention, at which the guidelines needed to be articulated.

5) Prior to early interventions

To understand the situation within the Science library prior to the first intervention, I briefly describe several student-led projects that generated interest for innovation at the Science library and introduced the library staff to the concepts of user- and design-led innovation. They represent the first building block of the research presented in this thesis, the first library-innovation spark.

The first student project (Reistad et al., 2012) has an app as a design outcome. The app helps users find books that are on the shelves of the Science library, or available electronically, see Figure 18. When the student project ended, the library had a working prototype that covered one specific shelf. The library then completed the process for other shelves and launched the app, which is still in use. The students wrote in their report that they were motivated to innovate “... since the library has...”
essentially been the same for many years, without much innovation.” The significance of the project was that it created a broad interest for user-driven innovation and demonstrated that the library could complete smaller innovation projects. For my own benefit, the project contributed to the Science library employees’ willingness and openness to support innovation efforts, and they participated in large numbers in the forthcoming interventions related to my research.

Figure 18 — App for a physical or e-book search and the option to scan the ISBN barcode of any book to see if it is in the collection of the Science library (Photo: A. A. Gasparini).

The second student project (Okun et al., 2013) used a new, small motion-tracking interface called LeapMotion. The Leap utilizes infrared light beams to precisely register movements and gestures in midair, within a radius of 30 cm. The students used the gadget to create a new interface to navigate the growing quantity of e-books. It provided a novel browsing experience. The result of the project was a functional service that is still used by the library on occasions where a small number of e-books needs to be displayed, for example, during a bioinformatics conference to showcase new books published in the field, see Figure 19. The library employees showed interest in exploring this new technology and developing technical competences to work with Leap, and they became curious about designing with and for new devices more generally. Their next project concerned just that – they tried to remedy some issues with Leap as an interface by exploring creative possibilities to use intermediary, soft surfaces for interactions, again with interaction design students.
The design thinking approach led to the creative generation of rapid prototypes and a hands-on (sensorial) exploration of intermediary surfaces, such as soft-touch screens made of plastic foil, bubbles that need to be popped in order to make a book selection, a conductor stick, and other ideas. Some of these prototypes are shown in Figure 20.

I also explored the possibilities of engaging students in more conceptually challenging, but fun, ways that did not necessarily involve technology design. I mention two of these projects, shown in Figure 21.
The first project aimed to engage library visitors in posting notes related to technology in the library, prompting them to say what they loved or disliked about technology. The second project featured a collection of sounds recorded at the Department of Informatics library. One could then listen to the sounds of the library (printers, computers, sneakers, food wraps, and other sounds). With a headset on, this was a surprisingly immersive and aesthetic experience. The last project that I wish to mention is a project in which a multi-touch table was used to create a novel interface for exploring books from the Science library’s sci-fi collection. The latter caught the attention of Her Royal Highness Crown Princess Mette-Marit of Norway, see Figure 22, while she visited the Science library.

With this background, I can now present the interventions that I carried out in the research for my thesis.
6.1 The Science library intervention

Intervention goal: The intervention aimed to introduce service and design thinking, through hands-on work, to library leadership and employees using scenario-based activities, such as landing and returning books to the library. Some of the design thinking vocabulary was presented and then put into use, in line with constructivist and experiential learning (e.g., divergent and convergent thinking, empathy, abductive thinking, rapid prototyping, user journeys, and touch points). Simple visual tools (e.g., cards and icons) were used to discuss problems.

Setting: The design workshop was organized for the Science library, with tasks situated in the context of that library. Tasks focused on the contrast between the digital and the physical library (e.g., find a book vs. find an e-book). The services in focus were the services for patrons. The participants were library employees (17), students (4), and researchers (4), excluding myself.

Duration: A full working day.

Research goal: Explore the use of open and inspirational tools, such as service design cards, in contrast to the use of a visual language (the subject of a colleague’s PhD thesis, and, thus, not elaborated on here) for the same tasks.

Tools: 1) AT-ONE service design card set, with additional cards that I designed for the occasion, together with a set of colored arrows and dots, so that participants could describe the flow and rank the tasks by importance; 2) Visual language icons (a set of icons representing different service touch points – see Figure 23; and 3) Usual workshop materials consisting of huge sheets of paper, post-it notes, and colored pens.

Procedure: The initial hour of the workshop was dedicated to the brief introduction of design thinking, service design, and concepts, such as customer journeys and touch points. The hands-on section of the workshop took most of the time and used scenarios that explored the contrast between the digital and physical library services for finding a book or an e-book, or the late fee payment experience online vs. the experience at the front desk. The participants were divided into four mixed teams (researchers, students, and librarians). Using cards for rapid journey prototyping, they engaged in a dialogue
around services, as well as reinforced the understanding of the service-design vocabulary (customer journeys, touch points, etc.). Then, the visual language for service design was used. I participated in one of the teams, photo-documented the workshop, and made annotations. In preparation for the workshop, I made additional library-related cards that were added to the AT-ONE set, as well as colored arrows and dots for marking the flow and grading the importance of tasks. During this intervention I observed the use of the added tools, and documented the process using hand-written notes and by taking photos. Post-intervention, I reflected on the outcomes, both of the design activities and the artefacts I had made for the intervention. For example, some of the cards worked well and were used again, while the dots were dropped.

![Teams working with cards. Selected elements of the visual language used (Photo: A. A. Gasparini).](image)

**Research reflections:** The main insight from this workshop was that different tools (cards vs. the visual language) created a different quality of experience. The visual language icons worked well for representing and understanding existing services – in fact, they worked much better than cards, which were much more ambiguous. But the card approach worked well for creating open discussions and meaning-making through the rapid creation of diverse (non-existing) alternatives. When working with the cards, the discussions were livelier, and all team members were engaged. The library-specific cards, as well as the arrows and colored dots, added to the experience of creating customer journeys and helped to visually enhance some elements, with meanings assigned by the team, such as the value of something. Both the cards and icons were effective in establishing a common understanding of the terminology used (touch points and customer journeys) and supporting fast learning and assimilation of these concepts.
Within my research context, I was engaged both in design and explorations during the workshop, and through reflections-on-action (Schön, 1983) later on, in establishing the relations between the contextual elements and the more abstract understanding of the significance of the tools used, the problems that were worked on, the composition of the teams etc. Some of the questions that I considered (both in-action and later) were: How do participants understand diverse tools (icons, cards, scenarios) in relation to tasks that they need to perform (e.g., to create customer journeys)? In light of the fact that the groups could not influence each other during the process, would they still think similarly? Would teams discuss the same topics? Would their journeys be the same? What would participation and communication be like when unfolding among researchers, students, and librarians (would, for example, researchers lead the discussions)?
6.2 The Open-Access intervention

**Intervention goal:** The intervention aimed to mitigate or remove (using design thinking) the lack of cooperation and strategy coordination among diverse departments at the University of Oslo, regarding Open Access as a publication channel.

**Setting:** The workshop was organized in collaboration with the Digital Services department (my workplace) at the University of Oslo Library. The services in focus were the services for researchers. Eighteen participants were invited: two interaction designers, four library employees working with Open Access, four participants from the library working directly with researchers, and eight participants from various departments within the University who work as consultants for research projects.

**Duration:** A full working day, including breaks.

**Research goal:** Explore the use of service design on a real-life, relevant library issue. In particular, there was a need for me to understand how design tools help to re-define problems (e.g., use of abductive thinking). Furthermore, I focused on learning processes and the shifting of thinking styles in combination with the use of design tools, as this represented an important part of gaining design capabilities.

**Tools:** Service-design cards (again, some of them made to support this specific task), a task sheet, and the usual workshop materials, such as post-it notes and colored pens.

**Procedure:** I opted to build the workshop around real-life situations that researchers (users of Open Access) encountered while trying to publish their work. The scenarios were selected so that they were suitable for changing thinking styles (divergent-convergent, abstract-concrete). The workshop started in a similar way to the previous intervention – with a brief introduction to design thinking, service design, customer journeys, touchpoints, and touchpoint cards, as the majority of the participants did not have previous exposure to design thinking, service design, or related processes. The participants were then divided into three groups, and each received a distinct scenario from which they were to use the task canvas to create customer journeys.
Figure 24 shows a user journey constructed by one of the groups. It addressed the case of a researcher who finished a research project and then realized that the contract with the funding provider required publishing in Open-Access journals or repositories. The journey shows the researcher’s options to achieve this requirement: word of mouth using an Open-Access expert, research colleagues (forskerkolleger), a research consultant (forksningskonsulent), or a website. The participants then engaged in design thinking to prototype new services for each of these options.

A post-workshop meeting with three of the library employees who participated (and co-organized the intervention workshop) offered the opportunity to understand how they experienced the workshop, as well as the use of design thinking in the context of their work.

**Research reflections:** An analysis of the pictures, notes, and rapid prototypes made during the workshop showed that discussions were rich, and scenarios were seen as both realistic and well-chosen to address the issues of collaboration on Open Access between different departments. All three groups understood service-design vocabulary and were capable of constructing customer journeys and discussing to what extent these solved the collaboration issues. The cards that I made did not cover the entire range of discussion, and participants used additional post-it notes. The discussion confirmed the existence of different practices across various departments at the
university. One worrying aspect was that the principles behind these practices also differed. By the end of the workshop, however, the participants agreed that designing a more unified view would be helpful, and they produced a common user journey that was not only liked, but also preferred to existing practices by all participants.

Again, I could observe that cards facilitated the establishment of a dialogue (e.g., dialogue and vocabulary building). Participants used the cards, sometimes creatively, with specific meanings that they assigned to them for the workshop. They also moved both themselves and the cards around the table to talk and construct a shared meaning for the journeys that they worked with. The participants recognized sound solutions and discussed further improvements by considering the weakest points of suggested solutions and seeking alternatives. This workshop brought to the forefront the importance of dialogical spaces, and why they need the presence of diverse voices for the best outcomes. It increased my focus on composing the design teams to ensure that different types of thinking, knowledge, and experience are present and exchanged.
6.3 The Law library intervention

**Intervention goal:** The intervention aimed to solve a set of organizational challenges surrounding the imminent move of the Law library to a new location. A merger of smaller law libraries into one large library complicated the move. The design activities focused on services that could support the merger and the physical re-location. The design tasks were open and involved making proposals on how to make a visit to the new library interesting for a broader academic community and which new services could make the library even more attractive.

**Setting:** This intervention took place at a resort outside Oslo and included an overnight stay. Eighteen participants, including the director of the Law library and the director of the University of Oslo Library, were present. Nearly all employees of the Law library attended.

**Duration:** A day and a half.

**Research goal:** Focus on time and communication, with exercises that engage, as well as cards. Reflecting on the time dedicated to the development of dialogical spaces and knowledge exchange, I decided to explore longer time frames to be able to spread out the activities, avoid participant fatigue and keep them engaged.

**Tools:** Service-design cards (some of them made to support the planned discussions), a task sheet, and the usual workshop materials, such as post-it notes and colored pens.

**Procedure:** At this point, many participants had attended one of the previous workshops or interventions. I could, thus, shorten the introduction and add new elements to the workshop. The tasks included user journeys as before, but were now interlaced with ethnography-based inquiry, dialogue, and design. The data collection for my research was done as before. In this intervention, I could rely for the first time on the competence in design thinking that the participants had gained so far. I also knew that they had been working with an understanding of the users’ perspectives on the use of law libraries.
After the short introduction of a few minutes only, the participants started to work on the first task. They used service-design cards to represent three distinct, real user journeys in the Law library, physical or digital. The next tasks required that the participants reflect on and map out these three journeys: to book the space to study, meet, and find a reading list for a specific law course. In the second part of the workshop, the participants worked on the re-design of the services discussed, with the new Law library in mind.

Having the possibility to use time between day one and day two, I could be more focused on the relevant activity happening during and after the intervention. I could also participate in discussions during the dinner and annotate how a specific project language began to emerge, based on the outcome of the design activities. In addition, the informal setting allowed the participants to come to me with their comments and remarks. The latter lead me to reflect on the connection between learning and time, and how important different layers of openness were (also, see Paper 5).

**Research reflections:** The design output from the workshop itself was richer than before. Several new services were prototyped, such as a service package for researchers, including new signage and way finding, an easy-to-get-in-touch service, and a wall in the library displaying the latest published research papers—see Figure 25.
Several participants, long after the intervention, told me that they now use design thinking in many different contexts.

The research insights from this intervention were significant. I became aware of another way in which time plays a crucial role and could now observe clearly a difference in how participants approached their tasks. They engaged with them almost immediately, in a manner that gave a sense of ability and knowledge. Thus, giving enough time for assimilation of learning was crucial. This also led to splitting interventions into several parts, allowing people to assimilate and then build further.

Since the workshop trip was overnight, it was also interesting to observe that the participants ate dinner while talking about the workshop, and about half of them used their time after dinner to continue working. They were deeply motivated and felt that their contributions mattered. In addition, when I walked into the workshop room the next morning, several participants had already been there for a while, working on their tasks. The cards were still useful to open discussions, but were, overall, much less valuable than before. There was no longer a need to establish a common vocabulary – a couple of relevant dialogues started naturally and in parallel, which is why I started calling the spaces where they unfolded dialogical spaces, in plural. It was also clear that open-ended activities, with some structure, resonated well with participants, felt more creative, and boosted the participants’ sense of competence and confidence in the design-based approach.
6.4 The web editors’ intervention

**Intervention goal:** This intervention was comprised of three workshops. Collectively, they aimed to use design thinking in order to improve web-editing services in the library by examining coordination between the practices that different departments have for maintaining their web pages and envisioning a common strategy for all.

**Setting:** Organized in collaboration with the Communication Department at the University of Oslo Library (UiO). Two workshops were held outside the university campus, while the third one took place at the UiO Library. All participants were web editors, and workshops had between seven and ten participants.

**Duration:** Two workshops were a day-and-a-half long with overnight stay, and the last one was a day-long workshop.

**Research goal:** Continue exploring how to support good dialogue, change the tools used to more advanced visual tools, such as Giga-mapping, and explore the time aspects further by engaging participants in several workshops that re-iterated and repeated content to some extent, but also built on each other. At this point, I also needed to see if a workshop could be carried out without my help.

**Tools:** Communication exercises (guided by the Communication Department), design thinking exercises, mind-mapping, and Giga-mapping. Materials, such as large paper sheets, post-it notes, and colored pens, were provided.

**Procedure:** The first workshop was led by the communication expert. I was an active observer. The second workshop utilized a set of design thinking exercises, including love or break-up letters that turned out to be quite popular (they were used to identify positive and negative features of web editing). The third workshop focused on collaboration between web editors, common vision and coordinated strategy.

In this intervention cards were not used at all. Rather, diverse forms of mapping and bodily performances were used, including reading the love or break-up letters and engagement with mapping while standing or doing other activities that engaged the body in different ways. A large mind map was made that gave an overview of the
projects, activities, actors, frameworks, and needs of web editors at the UiO Library. Giga mapping was then used to help clarify the processes, responsibilities, and roles of the various stakeholders. Thereafter, participants viewed the project in relation to the new portal for the UiO Library to see how design thinking could lift this project. Introducing Giga-mapping aimed to give the library staff the tools to map the landscape, as the web editors’ work includes interaction with several departments of the library and staff.

The first two workshops were planned carefully so that they increased the independence of the participants and the last one could be planned and executed without my involvement (although, I was present and available if there was a need). The outcome was a success in the sense that the participants felt a much greater sense of ownership over the ideas generated. They became even more interested in design processes, and those who were responsible for planning felt proud that they could organize and carry out a workshop on their own.

**Research reflections:** This workshop offered a particularly good opportunity to explore the creation of dialogical spaces between participants. The light and playful learning about good communication and performing a range of different design thinking exercises had the effect of making the participants feel like a design team that was at ease with each other. Different mapping techniques were effective in allowing the participants to easily see ‘new’ relations between diverse practices, principles, and needs in the work of the web editors. They could use what they had learned about communication and design thinking to discuss these in a productive and relevant way. Several dialogues opened up, their main teams then represented them visually, and further visualizations were used to outline new opportunities.

Although participants were exposed to new activities in these workshops, they were met from a stance of a design thinker: with curiosity, but also a serious sense of purpose, reflectivity, and the ability to compare to other tools, methods, or processes that they had experienced before. It was clear that they were purposefully seeking design opportunities, and they were also able to find them. The familiar exercises showed that they had become routinized behaviors. Thus, in addition to dialogical
spaces, I could see the elements of proto-practices in the foreground through this intervention.

Figure 26 — The judge judging answers to his questions. The poetry jukebox made new poems (Photos: B. H. Dahl).

Figure 27 — A sensory bonanza to stimulate sensory experiences. A striker for math questions (Photos: B. H. Dahl).

Nowadays, web editors are carriers of design thinking at the UiO Library — it became fully integrated into their daily work practices, implying that they have indeed succeeded in developing design capabilities. They are able to communicate better with others about the ongoing challenges and the design of new services, which are in the core of their everyday work. The following example illustrates the above statements. An open day is organized annually at UiO, and the library always participates. In the fall of 2017, the web editors’ group and some library employees decided that they would use design thinking and come up with novel ideas to engage the public on that
day. The result was the idea to create a Knowledge Tivoli (*kunnskapstivoli*) to engage people in thinking processes. For example, a station with a judge was set up, where the judge asked seemingly simple questions of the mainly young audience, such as “Are you allowed to hit your little brother or sister?” or “Can you mow the lawn on Sundays?” After receiving the answers, the judge passed judgment and decided on a sentence if the answer was incorrect and a prize if it was correct – see Figure 26, left. The poetry jukebox (the image on the right) had five wheels that visitors could turn to make new poetry from existing poems. Hitting the tall striker at another stand would result in a number that corresponded to a mathematical problem to be solved (Figure 27, the right-hand side image). Medicine was represented by a sensory bonanza, consisting of four boxes that could be smelled, touched, looked into, or heard (Figure 27, left). I regard these as examples that showcase design capabilities and transformative activities that are now common at the UiO Library.
6.5 The Virtual Tebtunis intervention

**Intervention goal:** Comprised of three design thinking workshops, a novel approach for digital humanities, the intervention aimed to explore a digital reconstruction of the ancient Egyptian city of Tebtunis to aid papyri researchers and other stakeholders. From the previous interventions, time emerged stronger as an important factor. In the Tebtunis intervention, involving top experts in different locations over a longer period of time was important to understand the different effects time could have on a more complex problem to solve. I regarded time as an important factor to further analyze concerning continuity of participation and learning. In addition, I wished to look into how the dialogical spaces and project language could evolve in different locations of the project.

**Setting:** Organized in collaboration with the leadership of The Virtual Tebtunis project, the workshops were held in three different locations. The first one was at the University of California, Berkeley (USA) with nine participants, the second one was in Oslo with 10 participants, and the last one was in Padua (Italy) with 14 participants.

**Duration:** A full day in Berkeley and Padua and half a day at the University of Oslo.

**Tools:** Digital tools, including Minecraft, see Figure 28, service-design cards, prepared canvases, and the usual workshop materials, such as post-it notes and colored pens.

**Research goal:** Explore a possible novel role for the library in the academic community, working in non-collocated, multidisciplinary teams, with continuity of participation, learning, and communication.

**Procedure:** I designed one set up to be used in each country to observe the different results in each. To further understand the development of a project language, semi-open templates and service-design cards were used. Therefore, it was important to prepare meticulously, especially because the participants were from a different field and had no prior exposure to design thinking. Thus, I organized a pilot workshop in Oslo to test the tools, with participants that were similar in composition to ones that would attend the workshops in Berkeley and Padua.
The Oslo group discussed the tools, such as the cards that I made, and the use of papyri and digital tools. As a consequence, a rough prototype of Tebtunis was made. I started the Berkeley and Padua workshops in a similar way to my first interventions, by giving a brief introduction to design and service-design thinking, including customer journeys, touchpoints, and useful mapping techniques. In Oslo this part of my introduction was not necessary. As a result, it was a shorter workshop. The participants in all three workshops were divided into two groups, the first focusing on papyrology research and new opportunities created by technology, and the second considering other possible contributions to the research. However, there were some small differences, which turned out to have a significant impact on the process. Two memos written after the Berkeley workshop were shared in Oslo, but not in Padua. Finally, in Padua the group composition was slightly different, as one of the groups ended up with all the senior researchers in papyrology, archeology, and the museum field, while the other group gathered together young researchers, librarians, and designers. This affected the outcome.

Research reflections: I understood this intervention as an exploratory exercise of relevance for my research. It was the first of its kind and presented a strategic opportunity for the UiO Library to serve as a knowledge hub and facilitate the transfer of our design thinking approach to the digital humanities. One important finding was related to continuity and temporality across different workshops (that were to deliver the same outcome). I could reflect on how design activities emerged, developed, grew and, in this case, terminated, over time. Another interesting aspect of the intervention was how different the design process was when working with top experts in their respective humanities fields, but who were novices in design thinking.

The exploration of alternatives towards the Virtual Tebtunis was accomplished with some level of success, but a realistic possibility for a solution has not been conceptualized – thus, in some senses, this intervention failed. There was not enough time to work with the subtle skills related to creating dialogical spaces, openness, and trust. Time, as one of the main lessons, has been discussed in detail in Paper 6. Here, I point to the importance of openness and dialogical spaces, in particular, of
taking time to implement some methods of creating positive dialogues, and finding a common project language, which are essential to navigating the ups and downs of the messy and challenging process that is design thinking. Despite some shortcomings, a number of papyrologists and other humanities scholars said that this way of working had an enormous impact on them and has changed how they will see cross-disciplinary research in the future.

Figure 28 – These images show tools, such as the model of Tebtunis in Minecraft, a papyrus from the UiO collection, an example of a card made for the workshops, and finally, the timeline showing the composition and continuity of participants in the intervention (Photo: A. A. Gasparini).
6.6 The Life Science intervention

Intervention goal: The intervention aimed to re-position the library in the new University of Oslo Life Science department and building (see Figure 29, building under planning. In the initial plans for the department, the library was given a small place to do old-fashioned library work. Two design thinking workshops were held. The first workshop sought to discover opportunities for the library to support the needs of the new Life Science department. The second workshop aimed to answer these questions: “What should the University of Oslo do to be known as a place for convergence and innovation? How could room be created for innovation in the Life Sciences building?”

Setting: Both workshops took place at UiO, where the leader of the Science library was the main initiator and organizer. I was a co-organizer in the first workshop (10 participants who were department heads, one was an architect), and a participant in the second (14 participants, all with different backgrounds, but some in leadership positions related to Life Science, including the dean, a student representative, employees from different Life Science departments, interaction-design students, and two library employees).

Duration: The first workshop lasted a day and a half, the second one a one full day.

Research goal: Design thinking for strategic planning.

Tools: The first workshop focused on ethnographic methods in design thinking. The second one used service design, which was supported by affinity mapping, user journeys, and story boarding.
Procedure: During the first workshop, the design brief was to think about how to make a welcome area for the new building. People took part in brainstorming what welcome implies in this setting. They were divided into groups that were sent out to identify three different welcome areas in three different buildings, including the look, feel, and function. The second day-long workshop – see Figure 30 – had a working title, Where cool things happen, and focused on cultures that support creativity, sharing, testing, and innovation among different departments moving into the new building. Some activities challenged the willingness to change the culture and organization of old departments that would become part of the new one.

Figure 30 — The wall from the second Life Science workshop, and a detail showing a story board representing user-led innovation and where cool things happen (Photo: A. A. Gasparini).

Research reflections: The leader of the Science library kicked off the intervention and explained that the design competence she had earned during earlier design thinking interventions allowed her to imagine how to use the approach to position, in this difficult arena, the new values gained over the past two years – focusing on creativity, invention, and dialogue. The library could contribute with these to the activities in the Life Science building. After experiencing the approach during workshops, the participants were convinced that the library could be a much larger stakeholder in the building than previously realized. Using the design approach in these two meetings, the library managed to change its position from being almost marginalized to being responsible for creative areas, such as the maker space and the creative-thinking lab. This was the point in my research where I decided to stop further interventions. It confirmed very clearly that the understanding of design thinking at the organizational level was now sufficiently deep.
6.7 The Kyambogo University Library intervention

**Intervention goal:** The intervention aimed to transfer the knowledge gained on developing design capabilities through design thinking to the Kyambogo University Library in Kampala.

**Setting:** The UiO Library with five participants, where two came from the Kyambogo library for the purpose of learning about design thinking.

**Duration:** Half a day.

**Research goal:** Explore transferability.

**Tools:** All the tools mentioned so far were demonstrated.

**Procedure:** Most of the participants were already acquainted. The Kyambogo librarians had been previously exposed to design thinking. We demonstrated how the tools were used in previous interventions and tested them on simple tasks. One of the methods we spent quite some time on was Giga mapping (Sevaldson, 2011), and we did the exercise of mapping out the complex context of the Kyambogo library – see Figure 31. The map was then used to work on prototyping additional new services and to work on some ideas that they had already started on in Kampala.

![Figure 31 — From the Kyambogo University Library doing Giga mapping when visiting Oslo (Photo: A. A. Gasparini).](image)

**Research reflections:** This project was related to transferability of the way I worked with building design capabilities.
A small digression to provide some context for this intervention is perhaps needed. Scandinavian countries and the National Norwegian Agency for Development Cooperation (NORAD, 2017), in particular, have a long tradition of supporting capacity building in the Sub-Sahara region, and libraries are a part of this. In African countries, libraries give access to relevant information, and have a central role as a meeting place and a place for scholarly work. Recently, the digitalization of library services has also impacted their libraries negatively, as it has done worldwide.

The design intervention described here was a part of a larger project that the University of Oslo has in Uganda, ENABLE (2015). My role in ENABLE was to help the Kyambogo University Library develop new services for students in a new graduate program at the Department of Special Needs Education and Rehabilitation.

I used this as an opportunity to propose design thinking processes and knowledge transfer and to discuss design capabilities as a way to sustain innovation. In this way, the library would be empowered to engage in innovation processes in general, and the requested service in particular. The Kyambogo University Library accepted this offer.

I visited the Kyambogo library in the fall of 2015, and gave a guest lecture at the end of which I handed out a questionnaire asking the audience how they perceived their library services. I learned that all students connect to the Internet using their smartphones and campus Wi-Fi. The use of laptops was low and visiting the library was still something students did. The data collected from the questionnaire was categorized using affinity mapping and post-it notes, see Figure 32. Some design opportunities emerged, ranging from technical (the time-management of the use of library computers), to the physical space in the library (more seats and resting spaces), the digital library (more electronic resources, seminars, information literacy (Bell, 2014), and library workshops on study methods), and the physical library (more books here too). This showed two things: first, the needs in Uganda were not that different from the needs in Scandinavian countries; second, the activity demonstrated that asking users directly gives feedbacks that allows for incremental changes.
Before I left Uganda, I gifted a set of AT-ONE cards to the library, so that they could use the service-design methods on their own. Some months later, I asked some librarians if they used the cards. In an e-mail reply, the head of the library wrote: “We had one [workshop using cards] with the library management committee, and we also agreed to have more of them, so at many sections [the cards were used], but I am not sure how many”. He further said that cards helped the library committee to develop a large diversity of ideas. This openness to use design was noted, and the ENABLE project agreed that two librarians from the Kyambogo library could visit Norway in May 2016 to learn about the approach and transfer the knowledge back to their library.

Back to the design intervention at the University of Oslo – the visitors from Uganda were not quite novices, but they were also left to their own resources to learn about design thinking and had a single tool, a set of cards. Thus, it was interesting for me to see whether it could be sufficient to tell people what the design thinking process is, give them a tool like the cards, and see the results. Luckily, this was not quite the case. Although they could say that they had certainly developed an interest in it, sought further information, and engaged in the practice, it was not quite working out, and that, while much can be done on one’s own, in-house, competent design knowledge brokers may be needed to support the processes of gaining competence. The workshop has helped the two visiting librarians to gain new skills and understanding. In addition, what I earlier called skills related to the creation of dialogical spaces are really important, as well as repeated interventions, some of which need to lead to positive change.
### 6.8 Overview and summary of all the interventions

The overview of interventions is shown in Table 2. The table highlights how different interventions used design and service design thinking.

<table>
<thead>
<tr>
<th>Library / Department / Project</th>
<th>Described in Ch. 6</th>
<th>Tools</th>
<th>When</th>
<th>Main focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library leadership</td>
<td>No</td>
<td>DT/SD</td>
<td>2013</td>
<td>Awareness of design thinking.</td>
</tr>
<tr>
<td>Science library I</td>
<td>Yes</td>
<td>DT/SD</td>
<td>2013</td>
<td>Tested design thinking and the use service-design cards and visual language for service design. Support dialogue and vocabulary building.</td>
</tr>
<tr>
<td>Library leadership</td>
<td>No</td>
<td>DT/SD</td>
<td>2014</td>
<td>Awareness of design thinking.</td>
</tr>
<tr>
<td>Library employees</td>
<td>No</td>
<td>DT/SD</td>
<td>2014</td>
<td>Awareness of design thinking.</td>
</tr>
<tr>
<td>Digital services / Open Access</td>
<td>Yes</td>
<td>DT/SD</td>
<td>2014</td>
<td>Service-design tools, construction of dialogical space, and convergence towards a common solution. The role of the library.</td>
</tr>
<tr>
<td>Law library</td>
<td>Yes</td>
<td>DT/SD</td>
<td>2014</td>
<td>Temporal aspects, dialogical spaces, shared meanings. Advancing methods, open vs closed tools and activities explored.</td>
</tr>
<tr>
<td>Science library II-III</td>
<td>No</td>
<td>DT/SD</td>
<td>2014</td>
<td>Awareness of design thinking.</td>
</tr>
<tr>
<td>PhD-on-track</td>
<td>No</td>
<td>DT/SD</td>
<td>2014</td>
<td>Tested to solve real-life complex problems in the library. Concept of library as a knowledge hub.</td>
</tr>
<tr>
<td>Intervention</td>
<td>Description</td>
<td>Year</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Tebtunis</td>
<td>Multidisciplinary teams. Library involvement as a hub on a real complex problem in a new domain. Focus on time aspects in design thinking tools, including semi-open design templates.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smaply</td>
<td>Digital tools for service innovation.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital services</td>
<td>Tools for innovation.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web editors</td>
<td>Communication abilities, dialogical spaces, bodily performances, engagement, new tools.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library for Humanities and Social Science</td>
<td>Focus on semi-structured design tools to support design capabilities and practices. Co-working with Sumit Pandey.</td>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lib-design</td>
<td>Focus on semi-structured design tools, including semi-open design templates.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Science</td>
<td>Strategic use of design thinking, communication.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Kyambogo University Library</td>
<td>Transfer of design thinking for development of design capabilities at the Kyambogo University Library.</td>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Overview of my interventions (DT = design thinking, SD = service design). The second column indicates whether the intervention was described in Chapter 6 or not.
A shift in the discourse on innovation?

As mentioned in Chapter 5, the content of the interviews conducted with UiO Library employees became much less relevant to my thesis. When I started analyzing the second set of interviews, it became clear that the focus of the research had shifted away from end-user innovation, not only for me but also for the library. However, the interviews were a part of my initial research as a PhD candidate. Looking back, I could perhaps blame my fascination with users as a part of the innovation strategy for the library and the newness of design thinking at the time. Gradually, and unnoticed, my design capabilities grew, and as they did, I could let go of this user focus. However, ethnography-based research was an important part of my initial work, and it still holds value for this thesis for two reasons: 1) it demonstrates clearly that the language around innovation has changed, and 2) library staff have acquired, at the very least, a whole new vocabulary, and, in some cases, additional design capabilities.

As a result, I briefly describe the interviews conducted in 2013 (the first round) and 2015 (the second round), the latter after a number of design thinking interventions (see Figure 33 for an overview).

As explained in Chapter 5, the same ten people participated in both rounds of interviews. One of them changed their position at the library, from one leadership position to another. There were six participants in leadership positions (general
director and five specialized libraries directors). There were four additional participants: one librarian, two advisors, and a member of the library staff working in one of the library’s engineering departments. The latter also participated in many student-driven innovation projects that the library offered to interaction-design students taking an advanced course in interaction design.

In Chapter 6, I discussed how student projects in the Science library, and the participation of library employees in them, generated an interest in user-driven innovation, and enabled me to introduce the concepts of user and design-led innovation in a way that seemed to deeply engage the library employees. Thus, the first step in my research was to set the benchmark for how library leadership and other employees think, talk, and discuss innovation in light of the fact that libraries need to transform and re-position themselves in the academic community, as discussed in Chapter 2.

The format of the interviews in 2013 and 2015 was quite similar. Each interview lasted between 30 and 45 minutes. There were eleven and fourteen open-ended questions in 2013 and 2015, respectively. This generated over two-hundred pages of transcribed and typed material, see Figure 34. I started the content analysis using HyperResearch software. However, when I started the work on the content from the second round of interviews, I could not relate it to my interest at the time. As a result, rather than continuing with HyperResearch and content analysis, I decided to look at the manner in which the library employees now talked about innovation, as the data showed a demonstrable change in their knowledge, attitude, and mindset. I, therefore, chose discourse analysis to treat this data, whereby I searched for repeatedly occurring, and evolved (in contrast to the first round of interviews), descriptions of innovation within the interviews. Talja (1999) argues that discourse analysis is more suitable for research as “interview data may be used to reveal regular interpretative practices through which participants construct versions of actions, cognitive processes, and other phenomena.”
Discourse analysis emphasizes that words with positive connotations, such as “openness,” “knowledge,” or “equality” (Talja, 1999: 467), have different social meanings based on the context they are used in and the type of discourse they belong to (Volosinov, 1986). Analyzing discourses involves looking into which words are chosen and the ordering, how often they are used, and how they may be linked to each other (Talja, 1999).

7.1 The first round of interviews (2013)

The findings from the first round of interviews showed that co-design efforts among the students and the innovation efforts of library employees carried out with students prior to this research, described at the start of Chapter 6, influenced the discourse around innovation. For example, all the participants were aware of, and had heard the talk about, end-user innovation. However, the interviewed participants could not discuss the concept of innovation in-depth, and none of them, when asked, indicated that they followed current innovation literature or practices. In addition, they considered student-driven innovation to be interesting, but they did not show an understanding of the role of design, even in this form of innovation. However, the literature shows that design knowledge and skills (e.g., design capabilities, as noted in Section 3.1) are a prerequisite for innovation (Rauth et al., 2014; Schreyögg &
Kliesch-Eberl, 2007). The transcribed interview data shows that design-led innovation was not perceived to have any importance for the library, as librarians are not designers. Design was not seen as a capability that the library could, or should, develop. The accepted norm was to hire an outside design consultancy for design needs. However, the interviewees described user-led innovation in these terms: development, experimental, fun, interesting cooperation, new way of looking into services, fresh, and hype. Overall, the discourse on user-led innovation was positive, but while novel, the leaders acknowledged that it lacked transformational power. These findings were in line with the Junginger and Sangiorgi (2009) model that shows three levels of organizational engagement – core, middle, and peripheral – where the latter would have only a marginal impact on organizational structure (see also Section 3.5). In my case end-user innovation corresponds to the peripheral engagement in this model, and thus cannot affect the core activities, strategies, values, or culture of the organization.

There was also no consensus among participants on what innovation is. To illustrate, I provide some sample responses (I intentionally did not label the interviewees in any way to provide anonymity, i.e., possibility of cross-identification):

“Eh, yes, innovation in the library. That is presenting what we already offer in a new way.” (Eh, innovasjon i biblioteket, ja. Altså det er det at man presenterer det vi allerede tilbyr på en ny måte) (an employee).

“For me, innovation must be finding something that makes the library better in offering their primary services, which are to support research and education. But it does not necessarily have to be about new library services.” (For meg, det må være innovasjon å finne opp noe som gjør biblioteket bedre i primæroppgavene, som er å støtte forskning og undervisning. Det trengs ikke nødvendigvis å være nye bibliotektjenester) (another employee).

“There is much of it (innovation) in the library. Very much. It can be about digital things, but it can also be about physical things. And those are the things I want to bring in here. I think that we have much development in the digital library. I have a huge desire to develop things in the physical library as well. That would actually be
my answer to that.” (På biblioteket er jo mye. Masse. Det kan være digitale ting men det kan også være fysiske ting. Og det er litt viktig for meg og dra med da inn i dette her. For jeg tenker det vi holder på med nå er veldig mye sånn utvikling av det digitale biblioteket. Men jeg har et stort ønske om at vi skal utvikle nye ting i det fysiske biblioteket også. Så det er egentlig svaret mitt på det) (one of the leaders).

“It is not so easy ... Innovation is often coming in the form of a product. Traditionally, the library is full of librarians who do not have sufficient abilities to change the product a little bit, to adjust it. Seen from this perspective, our way to innovate is within communication.” (Det er ikke så lett ... Innovasjon kommer ofte til oss i form av et produkt. Og tradisjonelt sett så er jo biblioteket fullt av bibliotekarer som har liten mulighet til å endre produktet littegrann, spisse det. Sånn at, egen innovasjon tror jeg blir på en måte formidlingsinnovasjon) (another leader).

“Yes, (innovation) is good and also, the University of Oslo has a very broad definition of it. It is just about new services.” (Ja, det er vel og også UiO har jo en veldig vid definisjon på det. Altså det er vel bare rett og slett bare nye tjenester) (a different leader).

The main insight from this benchmarking study was that while there was no common understanding and knowledge around innovation, it was understood as something positive. The takeaway was that the attitude and the mindset towards innovation were positive and suitable for initiating innovation processes. Applying the pragmatists principle of the supremacy of practice (Dalsgaard, 2014; Dewey, 1909), I concluded that design interventions should be design-practice based, but that increased sensitizing and knowledge building around innovation were also needed to initiate the transformation. Thus, the first interventions were a combination of information and knowledge communication, and hands-on applications of design- and service-thinking.

7.2 The second round of interviews (2015)

When the same ten library employees and leaders were asked similar questions again, fourteen interventions and two years later, it was easy to see that the discourse around innovation had changed. The participants now talked about innovation as a change, a
break from stereotypical thinking, and as a design – and even if the participants used different words to talk about innovation, this time there was a clear, common understanding of it. The following excerpts from the interviews also show a growing complexity of knowledge, as well as the enhanced communication abilities of the library employees and leaders.

“It is a process of change.” (Endringsprosses) (a leader).

“That means we should be open to change, have a willingness to change.” (Det innebærer at vi må åpne for endringer, ha vilje til å endre) (an employee).

“We will always think about designing services, and when we think about design, we think innovation.” (Vi tenker altid på tjenestedesign, og når vi tenker design, tenker vi innovasjon) (another employee).

“I think, it is a new thinking, a new gain, a development of new services. It is seeing the opportunities that the new technologies give us.” (Jeg tenker det er en ny tenking, ny vinning, utvikling av nye tjenester. Og muligheter som ny teknologi gir oss) (a leader).

“(innovation) gives us the opportunity to innovate in the library to make researcher's and student’s everyday lives better. It is also a bit interesting – when I think about innovation, I think about something like development of new drugs and such things. But I mean that the library is also running innovation, we are thinking in new ways.” (gir oss muligheten til å gjøre, inn i biblioteket, forskerens hverdag bedre og studentens hverdag bedre. Litt interessant er det med innovasjon, for jeg synes når jeg selv snakker om innovasjon så snakker vi om utvikling av nye medisiner og en del sånne ting. Men jeg mener at biblioteket også driver innovasjon, vi tenker nytt) (a leader).

“Innovation. Then I think about designing services, user experience, and user feedback, which is very important to get. So maybe ... some kind of mixture of hands-on activities, having UX labs, but maybe also share what users have given feedback on, so that the employees can say: ‘Oh, this was a good idea! Yes, we can do that…’
And so, it is so important with user feedback, right? Because then you may be really put on the spot, right?” (Innovasjon. Da tenker jeg design av nye tjenester, brukererfaring og tilbakemeldinger er veldig viktig å få. Så kanskje ... en slags blanding av litt sånn hands-on, ha UX-laber, men også kanskje fortelle litt hva er det brukerne har gitt tilbakemelding om da slik at de ansatte kan si, oj det var en god idé! Ja, sånn kan vi gjøre det. Og liksom, altså det er jo så viktig med brukertilbakemelding, ikke sant? For da blir man virkelig satt på plass, ikke sant?) (an employee).

“Innovation is not abstract. After all, it results in something concrete.” (Innovasjon er jo ikke abstrakt. Det kommer jo noe konkret ut av det) (another leader).

This clearly points to engagement at the mid-level (Junginger & Sangiorgi, 2009), perhaps even the core. In any case, the statements clearly show the participants approaching the possibility of engaging in core transformations within the library.

The word openness was not mentioned in the first round of interviews. In the second round, statements, such as those below, were raised.

“Yes, openness – if there is something that is new, so this is it.” (Ja, åpenhet – om det er noe nytt, så er det dette) (a leader).

“... there is an openness for the user perspective.” (...det er en åpenhet for brukerens perspektivet) (another leader).

“Everyone became very engaged during the workshops. Those whom I never expected to be were very engaged. That is an incredibly good win. I have rarely experienced something like that. I think of the years I have been here and all the seminars we’ve had about different things, I never experienced something that engaged the employees as strongly as this... I think this activity has challenged me to be more open to the methods you use.” (Alle var så engasjerte i workshopene. De som jeg aldri forventet fra var engasjerte. Dette her en herlig gevinst. Det er ikke ofte jeg opplever noe ont. Jeg tror at dette gjennom alle årene jeg jobbet ved biblioteket var det som engasjerte
ansatte sterkest. Aktivitetene i alle fall endret meg til å være mer åpen til verktøyene og metoder du brukte) (another leader).

The above quotes strongly indicate that the library leadership and other employees could relate to the engagement that design thinking activities brought about. They were equally positive with regard to the design thinking approach itself.

“It (design thinking) brings the whole library closer to each other.” (Det bringer jo UB veldig mye nærmere, altså nærmere sammen syns jeg) (a leader).

“It is a different way of thinking.” (Det er en annereldes måte å tenke) (an employee).

“It has been an important premise deliverer that has truly changed how we manage the library work practices, and the way we think.” (Har vært en viktig premissleverandør som har virkelig endra på hvordan man jobber, på hvordan man tenker) (a leader).

“It is not only about tools, that is, it is not only about learning different methodologies, but it is a way of thinking, a change in the culture.” (Ikke bare et verktøy for å, altså det er ikke bare å lære seg ulike metodikker men det er en tankegang da, en kultur endring) (a different leader).

“I was almost shocked that the engagement was as strong as it was. I experienced that just about everyone was engaged in the process, participated actively and challenged themselves, and really took off. That ..., yes. It has surpassed expectations. And I think that this (design thinking in the library) has enormous potential.” (Jeg var jo nesten litt forbusa over at engasjementet kom til å være så sterkt som det var. Men jeg opplevde jo at omtrent alle var engasjert i dette her og deltok aktivt og utfordra seg sjøl, og virkelig tok av altså. Det... ja. Så det har innfridd forventningene. Og jeg tenker på at vi har et stort potensial her) (another interviewee from the leadership group).

“Therefore, we can now challenge our traditional mindset, we have gotten a sort of tool set so that we need not sit here (at the library) and think that this is what we mean that the user needs. We can actually, using this methodology, come closer to what
works, and to what users need.” (Altså at vi får utfordre vårt tradisjonelle tankesett, at vi har fått liksom verktøy for at vi ikke sitter her og tenker at dette mener vi at brukeren har bruk for, men at vi faktisk ved hjelp av denne metodikken kommer nærmere det som fungerer, det som brukerne trenger) (another interviewee from the leadership group).

The second set of interviews clearly indicated that the knowledge and engagement of the participants was considerably higher than before the interventions, the mindset of the organization was that of openness (in particular, to learning about, and the use of, design methods), organizational values were in the process of changing, and design capabilities were being acquired.

This development led the library leadership, in 2018, to change the strategic plan for 2015–2020 (University of Oslo Library, 2018), which had been published in 2015. The change was made to explicitly include openness. The document now reads: “Openness: Working for a flexible and efficient organization characterized by openness and cooperation.” The leadership has confirmed that this change was a direct result of design interventions.

The changes continued to evolve and grow. They were also influenced and supported by the aforementioned Frilux work done by Pandey (2018). Further changes and influences were brought about by many smaller projects (e.g., the Artificial Intelligence for libraries project (Gasparini, Mohammed & Oropallo, 2018)), as well as large ongoing projects (such as, the Life Science project, described in the previous chapter).

7.3 Two additional inquiries and comments (2017)

In light of the impact and magnitude of these further changes, I solicited additional feedback from the leaders of the two largest sections of the library. This time, I was interested in finding out how they now saw innovation capabilities in the context of design-led innovation. This feedback was requested via email. I first shared my understanding of the innovation capabilities with them, so that we had the same understanding of what I was addressing. I confirmed that innovation capabilities are
related to: 1) available resources, seen as resources in people and their competence and knowledge, technological resources, networks, space, products and services, information, financial resources, and relationships with external partners; 2) organizational processes, structures, generative processes, and ways of working; and 3) values, norms, culture, and the criteria used for decision making in organizations.

Then I asked each of them to answer the following three questions:

1) Do you agree that the above can be described as “the organizational muscle for innovation?”

2) What can you say about the relationship between the three?

3) Which part of the above definition is the most important for the library?

I provide the answers of both of the leaders (given in English). These answers were to a large degree in line with my main findings on the importance of culture and mindset – thus, I found it relevant to include them here.

**Leader 1**

“The sets of criteria cover a wide range of important aspects in an organization. I agree that they would all, in some way, contribute to the organization’s muscle for innovation.

In my own opinion and experience, innovation capabilities depend on highly motivated people with different backgrounds finding common ground within the interfaces of their knowledge/fields. This requires a culture of trust where experimenting and learning by failing must be accepted.

Related to the criteria on your list, I would pick and choose from the three sets and give the following priority:

1) Resources in people

Of course, competence and knowledge will be important, but also the mindset and the mix of competencies and, not least, the creativity, confidence, and motivation of the
individual and the team to interrogate their own professional practice and "go the extra mile" (which has to do with both ways of working and culture, in my opinion).

2) Ways of working

Unless a common space for sharing experience and creating trust is developed within the working environment and the daily routine, innovation will be hard to achieve.

3) Culture

A culture for innovative thinking and experimenting will have to be created and fostered by: 1) finding the right people, 2) working together in a way that different competencies and strengths complement each other, and 3) in a culture of trust and creative interrogation.”

Leader 2

“The different aspects listed are certainly important factors in an organization’s ability to innovate, though I am not sure how the different aspects should be weighted or what is the "perfect" mix for enabling innovation best. What we have focused on at UB is creating a culture that supports and promotes new ideas, methods that can facilitate the creation of new ideas, and, to some degree, processes and support for enabling those ideas to develop. But, I think we still lack some of the ability, support, resources, or "muscle" to develop ideas for a product or a service. So we are quite good at 1 and 3, but not so good at 2.

Most important: I think that creating a culture for innovation is important, so I chose 3.”

Both leaders, therefore, saw the following as important: the culture (for which everyday practices are central), working in groups with different competences (where openness is at the core), and trust (which is the main ingredient for creating dialogical spaces, in which it is safe to share and communicate across the borders of different departments or other internal structures within the library).
Discussion

In this Chapter, I discuss how the published papers included as part of this thesis relate to the overarching issue that this thesis addresses. I do so by reflecting on my research questions and how these papers relate to them. I then translate the research outcomes to a set of practical guidelines for interventions and the overall process of developing in-house design capabilities in academic libraries.

8.1 The red line through the papers and the questions

In Paper 7 (Gasparini, A. Building Design Capabilities in Academic Libraries. In Design Management Academy conference Research Perspectives: In the Era of Transformation (ADIM) 2019), I propose Research through Design (RtD) and Design Research Triangle as the methodological approaches to the development of design capabilities when using design thinking in an academic library. This paper, as such, has a similar aim to this Kappe.

RtD is a good approach to use when the research is based on design practice. Fallman (2008) points out that drifting between studies, practice, and explorations is always unique, and cannot be prescribed. It enables a researcher to approach his/her inquiries and knowledge construction through multiple starting points. It ultimately contributes to rigor in this type of research and helps establish its relevance (Fallman & Stolterman, 2010). Moreover, drifting between different activities (studies, exploration, and design practice) gives a researcher/designer multiple perspectives on the subject of their inquiry.

I have followed the above principle of drifting, tracing the triangle in different ways and through many iterations, along trajectories, loops, and dimensions, while working in the real-life setting of an academic library. When operating in real-life settings as I did, with the access of an insider, knowledge is generated through immediate action and design intervention (Sevaldson, 2010). However, as Sevaldson points out, the knowledge gained in this manner may be difficult to generalize. Haner (2005) also claims that new ideas and changes need to be set in motion through activities, creativity, and innovation processes, which are complex, iterative, and often messy.
(Amabile, 1983, p. 167). In addition, each organization represents a unique set of challenges related to financial and human resources, practices, and a myriad of smaller conditions that turn most real-world design situations into testing problems. To be of relevance in such contexts, design interventions should be transformational (Fallman & Stolterman, 2010), and the evidence of transformational changes should be visible.

As mentioned in the introduction, I had a high level of personal motivation to undertake research and implement design that can make relevant and visible transformational changes at an academic library. Being a freshly educated interaction designer, and a novice researcher, I resorted to doing a lot of the preparation for the interventions, often conducting several workshops before an intervention in the University of Oslo Library that included library employees. The preparations included explorations, testing the tools that I thought could be appropriate to use in an intervention, determining the order in which I would do the activities, and the timing of different activities. For example, Figure 35 shows a set of cards that I made to explore experiences with services in the library.

![Figure 35 – Cards made to explore the user experiences in the University of Oslo Library (left), a practice Giga-mapping session (Photos: A. A. Gasparini).]

I tested these cards multiple times with students, exploring their experiences with library services. Similarly, the image on the right shows my brother, a documentary filmmaker, who spent an entire day with me, Giga-mapping documentary film production processes, so that I could master the method. These are two examples, among many others, that show how I learned, tested, and reflected prior to engaging
with library employees in design activities. In this sense, part of the research that I did was first-person research (which involves collecting data and experiences from researchers themselves), an increasingly accepted alternative to more traditional HCI methods (Höök, 2018). First-person research is also referred to as auto-ethnographical or autobiographic research through design.

Even though I chose design thinking as a tool with which to build design competences, as Chapter 3 shows, there is a rather broad range of opportunities for a design researcher to select appropriate methods, tools, and techniques to find out if, and how, library employees, as non-designers, engage in result-giving activities and implementing relevant design practices in their work context in order to bring positive change.

I undertook a great deal of research work, as described in Papers 1–5, which helped me to understand the available options and enabled me to determine their suitability for use in design interventions at the library.

Through my exploration of how and what to use (the methods and tools) at the start of my work with interventions in the library, I have learned that no method or tool works for all problems or in all situations. Also, I developed a preference for physical, rather than digital, tools, and for cards specifically – for the reasons described in Chapter 3. This preference was developed through my work with other tools as well, some of which are discussed in Papers 2 and 4. I used cards until the point when they were no longer needed – with an increase in understanding, skills, and the ability to synthesize, other tools became more effective and useful for evolving design capabilities. This resonates with Heraclitus’s observation: “All is flux; Nothing stays still.”

In line with a pragmatic outlook, I formulated my main research question in an open and exploratory manner.

**RQ:** How can we build and sustain in-house design capabilities using design thinking in an academic library?

To *sustain in-house design capabilities* became a matter of the ability to learn, see, and
reflect on ‘what is’ today (in terms of products, services, and strategies for the library), and where it could be in the future, as an ongoing inquiry. When opportunities are noted, shifting between making (through design) and understanding (through research) needs to take place, so that ‘what is’ transforms to a better or new product, service, or strategy. For these tasks, in-house designers and knowledge brokers need to choose appropriate methods and tools. This choice is often reminiscent of bricolage, “a useful and necessary concept for design researchers as it allows them to deploy available and established strategies and methods, but also grants them the license to create new tools and techniques in order to address questions that are beyond the realm of the established discipline” (Yee & Bremner, 2011, p. 184).

Yee and Bremner see bricolage as a concept of use for a design researcher, indicating that bricolage is an approach to choose both when designing and doing research. Just as one can make artefacts by finding solutions with the things at hand, a researcher who works in the field must find methods that work in a real-life context. If none fit perfectly, adapt and change until they do. The research methods that I have used to gain knowledge from interventions were observations (Chapter 5), and interviews (Chapter 7), quite common ones. However, I nearly always had to adapt design tools and methods to fit the context. Using reflection, and combining the research methods in appropriate ways for each intervention, I addressed my first research sub-question:

**RS-Q1:** What is the main characteristic of the organizational mindset needed to successfully introduce and integrate designerly ways of thinking within an academic library?

Even though I am an insider in the library, I truly did not know how the organization would respond to design-led innovation, where employees were designers. After the first intervention, the signals were positive. After further interventions, it became clear that there was an organization-wide openness to the use of design and service thinking and to the building of design capabilities. Thus, openness became the first concept that I began exploring.
The concept of openness has many facets and has been used extensively in many fields. Prior to my doctoral research, through student projects, I worked with open innovation, e.g., Von Hippel (2005). I found a great deal of previous research and worked with understanding open innovation to imply “innovation processes based on purposively managed knowledge flows across organizational boundaries” (Chesbrough & Bogers, 2014, p.1). Beyond innovation, openness is a concept used in, for example, morality, to imply being open to another person, idea, or perspective (McMahon, 1990); education, where openness is a virtue to be learned (Roberts, 2011); or business management, where openness is associated with organizational openness to change and innovation efforts.

In design thinking, as discussed in Chapter 3, openness is most directly associated with divergent thinking, often used in the sense-making and ideation phases of a design thinking process. It can manifest as engagement in participation and openness to crossing divides, such as gender, to listen to others and engage in new ways of doing and thinking. Nascimento and Pólvora express this as follows: “The openness in design is proceeding to larger spaces and seizing more opportunities to achieve wider results by altering more and more artifacts using what comes from the social” (Nascimento & Pólvora, 2013, p. 32).

In pragmatism, the notion of inquiry requires a certain way of thinking to be able to reframe a problem, and openness is needed to be able to take into consideration various perspectives on the issue at hand.

The design thinking approach aims to solve the issue of knowledge flow by choosing multidisciplinary teamwork to innovate (Brown & Wyatt, 2010). Design activities in teams also bring about other layers of openness, such as openness to collaboration, openness of tools, openness of methods etc.

**Openness to change**

Being open to change implies a willingness to engage actively in processes that lead to change, i.e., work on identifying opportunities for design to transform everyday activities. This may be understood as the willingness to re-think the existing services, or create new ones, with in-house design competences. At the level of work-practices, empathy, “ethnographic” walks, diverse creative mapping techniques, and other methods commonly used in design thinking (my scope of methods was limited to the methods suggested by IDEO, Modern Human, and others that I mentioned previously – 35 methods in total) were experienced by the employees as creative and novel ways to understand how to ‘look’ at existing services, work practices, and users through the eyes of a designer. The designerly approach is different from the predominantly quantitative approaches previously used for in-house user research, which consisted of questionnaires or counting the number of visitors and service users. Divergent thinking, supported by a variety of brainstorming techniques, was experienced as creative and open, bringing forward a diversity of perspectives. From the library’s point of view, such activities were new and frequently gave fresh insights, creating a continued positive attitude towards change.

My observations during interventions always noted willingness and a high level of engagement among participants in the form of eagerness to carry on thinking and working, as well as set changes in motion with regards to intervention tasks. For example, in the Law library intervention described in Section 6.3, the forthcoming move to a new location motivated the library leadership and employees to see the situation as an opportunity to consider both existing and new services, and to use design thinking to identify what and how they wanted to change. Similarly, in the Open-Access intervention (see Section 6.2), openness to change was evident by the library’s willingness to allocate both human and other resources to the process of re-thinking, openly and broadly, services around Open-Access publishing. Participants also remained engaged after the interventions had ended, and interviews clearly demonstrated changes in the organizational mindset.
Openness to learn

Openness to learn and acquire design skills and competences was central. Not everyone needed to develop designerly ways of working or become a knowledge broker. However, it was remarkable that nearly all employees wanted to learn and participated in at least one of the interventions to understand what design thinking entails. One intervention usually provided sufficient understanding of the process for a participant to become an active contributor in the future processes and dialogues.

To support learning through interventions, I used Beckman and Barry’s (2007) constructivist and experiential learning model, described in Section 4.3. I translated its principles into a sequence of activities in which I made sure that I oscillated between the concrete and the abstract, as well as having reflections and actions (I typically dedicated a longer segment of time at the end of interventions but interlaced shorter reflection periods throughout).

I considered the fact that the participants worked in teams, which supported rapid learning through the sharing of knowledge and skills. Together, the team members always passed through all phases of the learning cycle shown in Figure 10 (the integrated Beckman and Barry’s model described in Section 4.3). This implied integrating concrete experiences related to the issue central to the intervention, reflection and dialog, designerly action (design thinking methods, such as rapid prototyping), framing of the main concepts (abstraction), and iterating as needed.

Multidisciplinary perspectives can pose challenges. However, the presence of experts within represented disciplines, when they communicate their knowledge well, was conductive to fast learning (Jackson, 1999). Whenever possible, teams included such experts, who provided accurate information and shared their knowledge. As Papers 5 and 6, as well as the interventions in Sections 6.3 to 6.6, describe this was quite effective.

Openness to proto-practices

Openness to proto-practices, emerging new practices, was central to building design capabilities through design thinking processes. Successful integration of proto-
practices into existing practices was seen as the main way of sustaining design-led innovation (Pandey, 2015) and adding to the design capabilities. Openness to routinizing the use of design, by integrating what is learned through interventions in everyday practices, has been important for developing design capabilities at the level beyond the individual. The Life Science intervention (see Section 6.6), as I pointed out earlier, clearly demonstrated that this process has taken place and that the library has integrated designerly practices to a sufficient level to be able to use this way of thinking and working strategically, as well as successfully re-negotiate its own future in the new department that is being established.

**Openness and multidisciplinary teams**

Openness to work as part of a multidisciplinary team, implies openness to dialogue and knowledge sharing. How individual team members relate to being in the team depends on their personality, behavior, and prior experience with work in group settings. We all know someone who likes to ‘steal the show’ in group situations. Openness to being part of a multidisciplinary team implies also the willingness to adjust such behaviors and shift from personal to collective interests to take full advantage of the diversity of competencies. The University of Oslo Library today supports multidisciplinarity internally in many of its projects, since different departments within it have different competences. This development is recent, and a direct consequence of exposure to design thinking – see Chapter 7 – and experiences from interventions. Working in such teams is now perceived as useful, democratic, and effortless, as the teams are self-organizing. Positive experiences with well-structured teams keep the willingness and openness to participate strong.

**Openness to collaborate**

Openness to work with other researchers and designers, who are engaged in similar research practices, to foster positive collaboration and explore the building of design competences, is another way to increase competence in design thinking and new knowledge production. Paper 4 showcases how my research colleagues (Pandey and Culén), interested library employees, and I became engaged in collaboration with researchers from the Library Science department at Masaryk University. The
collaboration focused on testing design tools and their open-endedness. Using this collaborative research process brought about many new insights as to what tools best support design thinking processes, what to explore further, and how different thinking styles and different affinities towards analysis or synthesis influence processes. Through this collaboration, we could clearly observe the difference in processes when working with researchers versus designers.

**Openness and design tools**

Using tools that are open, but provide some structure for thinking processes, allows for creativity instead of being limited, as shown in Paper 4. They effectively support both divergent and convergent thinking and enable a broader understanding of the problem space (e.g., Giga-mapping). In addition, such design tools effectively support communication and dialogue during design interventions.

The aim of creating semi-open templates was to provide open-ended spaces where the participants could engage with the problem at hand, freely using their experiences to address simple and open tasks presented by the template. After working with a template, participants often felt that these allowed for reflection and learning, both when they felt that they had succeeded in handling their task and when they did not feel so. In the latter case, they appreciated the learning.

After several design workshops where templates were used, I observed that they were also used in the context of everyday work. The degree of adaptation was high, including the use of new vocabulary, for example, *friluxing*. The threshold to integrate these templates into day-to-day use was low, and this is part of the reason why these design templates became carriers of proto-practices in the library.

**Openness to evaluate the design thinking activities**

This point relates to the willingness of the library to periodically evaluate the effects of design thinking, as well as consider other ways in which it can be used. For example, using design thinking to re-think organizational core values and visions, including openness at the strategic level. It also requires the leadership to be open to evaluate design thinking practices that are starting to take hold, as well as consider proto-
practices. In line with Malmberg (2017), I have discovered that when design capabilities are part of the work practices, long-term strategies are affected, and evaluation should be a part of the process.

In conclusion on RS-Q1, I wish to emphasize the importance of divergent thinking, which was used in diverse forms of brainstorming and mappings. It was experienced in all the interventions as creative and safe, and as contributing to the experiences of openness mentioned above.

For the library, the mindset of openness was necessary to be able to look into and recognize new possibilities, include various perspectives, respond to external demands, participate in design-led interventions, learn, and be creative. It was recognized by the library leadership as the most important property of the mindset needed to respond to challenges by innovation. This is part of the design capabilities that the library’s staff has now achieved, and has enabled access to designerly ways of thinking, which were previously absent.

From my own perspective as a design researcher, supporting openness required a focus on how to best exploit the advantages of divergent thinking during an intervention. The semi-structured tools were found to support this activity best.

I would like to close the discussion on openness and Paper 5 with two quotes from interviews presented in Chapter 7: “Yes, openness – if there is something that is new, so this is it.” and “... I think this activity has challenged me to be more open to the methods you use.”

The latter provides a good transition to my next research sub-question.

**RS-Q2:** What methods, tools, and techniques best support non-designers (library employees) in integrating design-led practices into their everyday work?

I have spent much time exploring diverse tools, methods, and techniques that could work well with people who are not designers and enable them to gain design capabilities and develop proto-practices. The first five papers that are included in this thesis are, in different ways, concerned with tools.
In Paper 1 (Culén, A., and Gasparini, A. *Find a Book! Unpacking Customer Journeys at the Academic Library*, in the proceedings of the Advancements in Computer-Human Interactions 2014 conference), the first paper that I wrote as a PhD candidate, I discussed the use of service-design cards in a series of four workshops. The cards were added to some self-designed cards and other visual elements to facilitate the representation of user journeys and the flow and importance of touchpoints. The outcome of this paper is that tools need to be context-sensitive, i.e., the added elements were helpful for both understanding and rapid prototyping of user journeys. The paper also points out that there is a cultural difference between how users see services and how the library sees them. The workshop helped library employees to see that students’ journeys all started online, while the library employees started at the physical library spaces. The first intervention in the Science library is based on one of the four workshops described in the paper, but it also tested the visual service design language, which was a part of the PhD work of my colleague, and, thus, not included in the findings of the paper.

In Paper 2 (Chasanidou, D., Gasparini, A., and Lee, E. *Design Thinking Methods and Tools for Innovation*, in the proceedings of Design, User Experience, and Usability: Design Discourse 2105 conference), we explored the use of digital tools in workshop settings with non-designers. Specifically, we tried Smaply, the service design tool, to support decision-making in service design projects. The tool enables the easy creation of personas as user representatives, stakeholder maps, and customer journeys. The results confirm that the tool was indeed easy to use, but for it to be truly helpful, one needs multiple perspectives (multidisciplinarity), as well as diverse thinking styles represented in the team. The latter is crucial, because the simplicity of the tool would become a limitation if all participants had the same background (as in one of our workshops in which the activities became somewhat repetitive). As a result of these insights and my observations made in the workshops with cards (Paper 1) I opted for more open-ended, tactile, visual tools (cards) to continue working with in the early interventions.
In Paper 3 (Gasparini, A., and Chasanidou, D. *Understanding the role of design thinking methods and tools in innovation process*, in the proceedings of The XXVII ISPIM 2016 conference), we focused on tools, platforms, and barriers for innovation. This paper was based on a set of interviews with employees of one of the largest Scandinavian communication companies, with a strong innovation culture. They were in-depth interviews on their innovation practices, including online platforms and tools. The respondents used a broad range of common design thinking methods and tools, such as personas, storyboarding, prototyping, scenarios, stakeholder mapping, focus groups, observation, surveys, and interviews. The company also provided digital innovation platforms, also open to outsiders. Some of these platforms had a high learning threshold, which presented barriers to starting to use the available tools. For that reason, the platform was not used as much as it could have been. We advised them to remove these learning barriers. Since many different departments had their own innovation platforms, they could not share and there was little flow of ideas between departments. This situation was similar to the intervention challenges presented in Chapter 6, the Open-Access and web editors’ interventions.

In Paper 4 (Culén, A., Gasparini, A., Minaříková, P., Novotný, R., Pandey, S., & Zbiejczuk Suchá, L. *When Designers are Non-designers: Open Endedness vs. Structure of Design Tools*, in the proceedings of the International Conference on Interfaces and Human Computer Interaction 2016), we formed four matched design teams, consisting of design researchers, librarians, and novices to design thinking (students). Two teams tested both semi-structured tools (rather open-ended, but with some guidance as to what could be done in different activities) and closed tools (such as business canvas, where one has to brainstorm around four specific prompts). The third team tested fully open design briefs, without any supporting tools (just paper, pens, and post-its (which ended up unused)), in Oslo, and a team in Brno followed the same approach and obtained the same results as we did in Oslo. The conclusion was clear – closeness and full openness of prompts limit inspiration and give rather weak results in terms of the number and novelty of ideas produced. The findings, in fact, showed that either tightly organized, or the open, design activity could have a negative impact on outcomes and on communication within a team. The use of the semi-
structured approach, conversely, yielded a number of novel ideas and prototypes. This was an important finding that influenced much of my work later on.

Openness of tools was also briefly discussed in Paper 5.

As mentioned in the discussion of RS-Q1, an openness to integrating new designerly practices, proto-practices, with existing everyday practices is important.

Concluding on RS-Q2, I note that the above papers (supported also by what the library leaders said during the last round of interviews (see Section 7.3): that the affordances of the tools used in interventions were just the right kind of tools to use), imply that the methods and tools used are crucial for interventions, but also for supporting the slow integration of the library work practices with design practices and supported learning. The RtD approach effectively supported my research activities, allowing me to reflect on my actions, both in situated action and on action. It helped me to organize the research and its documentation so that I could easily look into folders for individual interventions, as well as into several of them simultaneously, enabling synthesis, pattern finding, and reflections on the temporal aspects of shorter and longer processes. For example, I could easily review the notes to see that cards were a suitable tool for all participants at the start of the process, due to their properties, as described in Chapter 5.2, but later, mapping tools and workbooks were preferred. Finally, people were able to adjust these themselves, so that they could best support the tasks at hand.

**RS-Q3: How can communication among team members be supported in design processes featuring non-designers?**

Since teamwork in multidisciplinary teams is a signature characteristic of design thinking in management, the communication issue among team members becomes an essential issue to examine. Thus, the second concept that I focused on is that of dialogical spaces.

My initial concerns were related to the physical spaces where interventions take place, as previous research (Haner, 2005; Thoring, Luippold, & Mueller, 2012; Hillier, 1996)
points out that space affects creativity, playfulness, sense of well-being, and identity. The place itself should make the participants in interventions feel at ease from the moment they enter it and invite them to communicate with each other. Intervention settings need to have enough space for design activities, including wall space or other vertical surfaces for the ease of sharing. At the same time, proximity among participants is important, as it supports not only collaboration (Lee, Brownstein, Mills, & Kohane, 2010) but also other types of activities, such as social moments (e.g., coffee breaks and informal chats). Furthermore, it is highly desirable for the space to be configurable (Kristensen, 2004), that is easy to move objects, such as tables and chairs, around, especially when people spend a long time (a full day, for example) in the space. Configurability can be a factor that enables a variety of bodily performances and movements (see Section 4.4), which are central when routines are learned, evolved, or disrupted (crisis of routines).

“Ideas and thoughts gather power and energy when they can be seen and interacted with” (Wycoff & Snead, 1999, p. 56). This implies that adding materials to the space, which the participants can interact with, such as design tools and things to support creativity (such as post-it notes, whiteboards, cardboard, tape, large sheets of paper, and appropriate objects to motivate, teach, or challenge), increases the power and energy of the processes that unfold within such a space.

My present understanding of a dialogical space has communication at its core. This makes the physical space where dialogues unfold a part of it. Other parts relate to: 1) cognitive room for debate and negotiations; 2) the creation of a common project vocabulary (leading to a common understanding of the language used in the project); and 3) knowledge sharing through multiple dialogues.

When aiming to introduce design thinking in an organization, such as an academic library, design knowledge brokers and non-designers need to find a way to cooperate, share knowledge, communicate, and exchange and demonstrate their skills, so that they can engage together in solving a problem. Krippendorff (2006) postulates that there are two ways to reach a common understanding during design processes: a
“monological passage,” where a person takes a lead to explain something, and a dialogue. I have used both approaches and expanded on the second one.

Monological passages were used in seminars to inform on what, for example, service design is. I reduced this to the minimum, focusing on dialogues and hands-on activities instead. Explaining something using a monological passage does not imply a common agreement on what was said, or a common constructed meaning related to the topic at hand.

As design thinking involves multidisciplinary teams, it is natural for multiple dialogues to emerge. Moreover, at the start of a collaboration, people from different disciplines could be using the same words, but the meanings could differ, and, as a result, shared understanding would be hard to reach. Consequently, creating a common vocabulary, and outwardly expressing the meanings, establishes the grounds for good dialogical spaces later in the process. For instance, architects use a ‘vocabulary of a project’ as a means to solve design problems (Boland, Collopy, Lyytinen, & Yoo, 2008, p. 14) – the vocabulary includes the concepts that frame the project. Others, such as Lawson (2006, p. 250, 2010), suggest the concept of crises as inquiry mode. This resonates also with crises of routines, one of the ways to prompt new behaviors when working with proto-practices, Section 4.4. Creating a crisis, then, is also a dialogical intervention that, when done at the right moment, helps with the re-framing of complex situations and seeking of alternate solutions.

Visual representations, such as images and sketches, promote consensus and aid decision-making. Visual representations, which may be seen as the production of visual languages, are recognized as facilitators of cognition (Karabeg, Akkok, & Kristensen, 2004; Schønheyder, 2019). Using a visual language may facilitate clarity, speed, and ease of communication, and it is highly recommended as a way of supporting dialogues. The most successful tools in my work have been the ones that were highly visual, such as cards, Giga-mapping, and the use of visualizers, in line with what Schønheyder’s (2019) work suggests. When using words, team members’ values cannot be separated from their language usage in a specific context, and this sometimes creates communication problems. Visual communication reduces such
risks. However, sharing with others is not enough – one needs to accept the co-existence of diverse opinions and points of view, and work with this diversity as a highly respected resource. This may be regarded as mutual respect and the safety of a dialogical space, in which no team member should feel that his/her inputs are under-valued. Usually, teams choose someone to facilitate the creation of a dialogical space and serve as a mediator. Mediators need to be aware of problems and biases, and how they can affect the whole process (Rowe, 1987, p. 73).

In design thinking, a hands-on phase, in the form of prototyping, is important, as prototyping engages in activities, and at the same time supports communication. With visual tools, such as cards or mappings, both visual and verbal communications are used, and I believe this combination works well for non-designers. Prototyping, through material and tangible means, allows idea communication, with minimal possibility for misunderstanding. Redefining and changing a prototype and working with alternate options that aim to solve the same problem, also help to renegotiate meaning (Blomkvist & Holmlid, 2011; Schön, 1983). The meaning gained through prototyping influences the development of a common, negotiated, and adequate design language, where “proposal hypotheses or plan of action take a form of mutual responsiveness” (Rogers, 2009, p. 191).

I have focused on how to establish these dialogical spaces. The notion of dimensions in Fallman’s design research triangle opens up the possibility of using dichotomies as a way to ‘stage’ fruitful debates. I have used this successfully on many occasions. Dialogical spaces gained importance for my work after the Open-Access intervention and were crucial in the Tebtunis intervention, in which the scientific field proximity was present, but there were also strong differences in meaning.

Finally, awareness of the concept of dialogical spaces has in itself affected their establishment and use at the library. Re-thinking the concept on its own terms, the library leadership came to understand the strategic model of the library as a knowledge hub negotiating the management of creativity zones that were highly influenced by the concept of dialogical spaces. I also repeat the development of new vocabulary, such as friluxing (Gasparini & Dahl, 2018).
In conclusion, on RS-Q3, rather than talking about the importance of a dialogue, as Krippendorf (2006) and many other design researchers do, I coined the term “dialogical spaces.” It reflects the concept of both physical and mental spaces in which a cross-disciplinary project takes place. “Dialogical spaces.” shapes the project and design vocabulary within multidisciplinary teams, adequate design tools, a new understanding of knowledge becomes available, new one through the project, through multiple dialogues. The participants I chose in my interventions often had different competence fields (for example, a theater actor and an archeological expert in the Tebtunis intervention). Just as their competences were different, the mental models they had of the problem to solve (inquiry) were likely different. It was then important to use tools and methods that would support the creation of a common model, by allowing participants to explain what they thought, and in collaboration with others find a common understanding. This was a crucial aspect of supporting good communication among team members in design processes, especially when they featured non-designers, as was the case with the library employees. In addition, the design activities and processes allowed each participant to have an equal opportunity to develop an adequate and common project language. What I then observed was how such processes unfolded in-action, but also in everyday library activities post-interventions. For example, as already mentioned, new words were added to the common vocabulary every day, such as friluxing.

**RS-Q4:** What are the temporal features of design thinking processes in organizations, such as an academic library?

Time can be defined as a chronological, step-by-step sequence of activities (*Chronos*). However, for each individual, the quality of experienced moments leads to a different perception of time (*Kairos*) (Harrison & Cecchinato, 2015). I have come to measure the success of my interventions in terms of Kairos – the good ones seemed to last just seconds. On occasion, especially in my own investigations outside the library, I have experienced the never-ending ones too. Aristotle defined time as relative to changes and the qualities introduced by the change (Coope, 2005, p. 53), change being related to a perception of time. This is not to say that a lot of changes and different activities
are good to have, and that living in “time poverty and hurriedness” (Shove, Trentmann, & Wilk, 2009) is appropriate. For positive experiences and enhanced learning from interventions, one needs to understand how to space out breaks, activities, challenges, changes, fun etc.

The temporal aspects of design processes, such as those discussed in this thesis, have been understudied and perhaps not reported on accurately (Huang & Stolterman, 2011; Langley et al., 2013). Referring to temporality in interaction design, Huang and Stolterman point out that the way in which stories around interactions are articulated raises a risk of omitting possibly significant, smaller events: “In many cases, interaction designers and researchers describe an interaction just like they would tell a story. When people tell their own story, they describe the story details as a sequence of continuous events. ... Those descriptions, however, focus often only on some major events (particular sessions) during an interaction.” (2011, p. 1)

Langley et al. state that empirical studies of changes in processes versus changes in things may be more challenging to operationalize: “The language humans use to talk about our everyday world is naturally dominated by nouns, with verbs associated with action and change taking a secondary role. This may be one reason why so many process studies retain, to some degree, the language and ontology of substance even as they explore activity, event sequences, the unfolding of practices, enactment, and the dynamics of change.” (2013, p. 1)

In their work, Karapanos et al. (2009) consider temporality in terms of three phases: the orientation (becoming familiar with something), incorporation (prolonged use) and identification (how a design activity becomes meaningful in one's life). The authors are concerned with these steps when design teams have to assimilate, use, and adapt design methods to new contexts. My work has led me to a similar understanding of the temporal aspects of design processes. I did not think of temporal aspects at the start of my work, but intuitively followed the phases of orientation and incorporation. Over time, I became increasingly aware of the centrality of temporalities to the acceptance, integration, and transformation of the library practices as a result of design thinking. Following the timeline in Figure 17, I could say that, at the macro-level, the initial
interventions in many ways corresponded to organizational orientation regarding the new activity. The mid-period interventions corresponded to integration, and the latest interventions showed the identification phase, especially the Life Science project, described in Section 6.6.

Different temporal aspects, with regards to how bits and pieces of design activities emerge, develop, grow, or terminate over time, made me reflect on the fact that these aspects have been rather neglected and underdeveloped in the literature. In addition, as I increasingly noticed the inter-relatedness of temporal aspects with learning and the development of dialogical spaces, the importance and urgency of a better understanding of temporalities increased. This came to the forefront in the Virtual Tebtunis intervention.

In Paper 6 (Gasparini, A., & Culén, A. Temporality and Innovation in Digital Humanities: The Case of Papyri from Tebtunis, published in the journal Interaction Design & Architectures(s) 2017), we discuss the importance of temporal aspects in complex design situations involving non-collocated, multi-disciplinary design teams. We focus on three aspects: 1) awareness of temporal trajectories in the process and how to bring continuity to an otherwise fragmented workflow, 2) temporality of learning through such processes, and 3) discussing opportunities for design thinking concerned with the temporal aspects of the process.

We suggest three different timeframes – the underlying layer of a timeframe for the whole project or research period (long-term, macro-level, described above), a timeframe for scheduling interventions with multiple events (mid-range term time between interventions or workshops), and a timeframe for individual events (short-term, micro-level). These are represented in Figure 36. Time concerns related to processes of assimilation of learning, re-enforcement of learning, and integration of proto-practices are examples of temporal aspects that require a longer period of time. Paper 6 demonstrates, for example, the importance of continuity in the workflow and knowledge sharing. In the Tebtunis intervention, this was accomplished by allowing some participants’ trajectories to encompass the whole project – making them into
project knowledge brokers who could facilitate faster learning easily and communicate ideas that had been worked on previously, to avoid unnecessary repetition.

I was also concerned with timeframes between different interventions, during which I would typically engage in design studies, making tools, thinking about methods, or observing how what was learned was being taken up (or not) in the library. In between interventions, I was also aware of picking up signals on where the next, different issue could be found, so that design activities retained their relevance for the organization.

All the interventions that I organized could have also been described in terms of time at the short-term level, in the context of a single workshop. I paid meticulous attention to the time in the planning phase and piloted each workshop at least once, only to improvise in the workshop setting itself. This ‘improvisation’ at the workshop was guided by a sense of quality and the importance of actions taking more, or less, time than planned because each group of participants is different, and activities may require different time intervals. The establishment of a project and design vocabulary, the orientation phase of the project, was nearly always the most difficult to predict and plan for. Piloting the actions before the intervention allowed for a relatively precise determination of the time the activities would take. The dialogue creation and knowledge sharing in dialogical spaces, as well as a summary of the activities and outputs of the intervention, were also difficult to plan with great precision.

Some interventions in the course of this research were relatively simple, and consequently took less time. Others took several design events to complete. Between design events, in the context of these larger interventions (e.g., the Tebtunis or web-editor interventions), the integration of gained knowledge and changes in the mindset or in practices needed time.
Figure 36 – Short-term, mid-range and long-term time concerns.
This kind of temporal perspective is little understood because it is subtle and unnoticeable for those who are not a part of the organization (this links back to the importance of insiders and knowledge brokers for the development of design capabilities). How can one support and how much time must one dedicate to these processes? If new participants attend different events within an intervention, as was the case with Tebtunis, how can one save time related to establishing dialogical spaces, and the orientation phase? The findings here indicate that selecting knowledge brokers here is also necessary (a number of participants, two or three, should be the same in new design events).

All the interventions span a roughly three-year time period. Although the portfolio of interventions was diverse, they were all aiming to gradually integrate design thinking and help build design capabilities in the library. Simple projects, seen in isolation, may not be significant. However, distributing these smaller, manageable, and possibly inspirational projects across time, kept re-enforcing the learning, as well as pushing it incrementally forward. The diversity of the interventions kept people open for participation in many interventions. Repetition and diversity were hugely important factors for building capabilities over time, and they represented essential temporal concerns. There was no prescribed number of interventions that I had to do. I tried to use the momentum and interest generated by one intervention to organize the next. In this process, I tried not to hold them too close to each other, so that they did not become burdensome, but to hold them close enough so that people did not forget what they had learned and could build on the previous ones. Moreover, the employees needed some time to explore and integrate the knowledge acquired through the workshops.

In HCI, it is relatively common to pay participants in research or design for their time investments. During different interventions, no participants were paid for their extra time (for the library employees, if the work took place during working hours, they received their regular pay, but no overtime. Others volunteered). By way of a return on the time investment, I wanted the interventions to positively influence, possibly
change, their outlooks. Most participants, if they were novices, were happy with the learning process, and if they were experts, with sharing knowledge in a real-life and meaningful setting, usually with people who were engaged.

Together, the four sub-questions that I addressed above provide significant insights towards answering my main research concern:

*How to build and sustain in-house design capabilities using design thinking in an academic library?*

In summary, RtD, a design practice-oriented research approach, in combination with pragmatism and experiential learning, has been an effective way of introducing design thinking and building of design competences for the University of Oslo Library. Real-life issues that the library was engaged in were used as cases to be solved through design thinking, and in the context of experiential and hands-on learning. This was crucial for the library leadership, as well as others, to understand the relevance of the approach. The reflections on the process have unveiled three elements as essential aspects of the process of building in-house design capabilities: openness, temporal aspects, and dialogical spaces.

**8.2 Practical guidelines**

I now provide my reflections on what has worked well in this process at the practice level. I start with reflections on the individual events, and then provide some generic guidelines for the overall process of building design capabilities.

**Workshop guidelines (workshop facilitator)**

1) When a suitable issue is found for an intervention, the workshop facilitator should first work on their own understanding of what the issue may entail. This can be done through: 1) looking up previous research, e.g., literature review, and 2) considering the issue in the design contexts historically, philosophically, and theoretically, as well as at the level of similar examples and solutions to those.
2) Decide on an appropriate approach for the intervention, including tools, methods, techniques, and materials.

3) Pilot the workshop, focusing on workflow, possible tensions that could support dialogues, knowledge, and learning needs.

4) Reflect on the outcome of the pilot and adjust or change what did not work.

5) Think of people who have the knowledge and thinking styles that would support the process during the intervention and invite them to be on a design team (one does not always have control over all invitations, but an extra person can always be brought in). Send invitations for participation in advance. This is an opportunity to articulate some thoughts related to the intervention (why it is important, what already acquired skills would be highly appreciated, what may be the new benefits etc.).

6) Create of a list of expected outcomes for the participants.

Iterate steps, until the problem, related concepts, theories, and some possible solutions are well understood, as well as the tools, techniques, and activities that may give the best results for the case at hand. A sample of what could be expected as outcomes for participants (point 6 above) is provided.

**Workshop guidelines (expected outcomes for workshop participants)**

Participants should be able to:

1) Resolve the task conceptually

2) Generate multiple ideas

3) Turn ideas into concepts

4) Relate concepts and design proposals

5) Engage, at least philosophically, with the consequences of design proposals

6) Re-frame the problem

7) Demonstrate design by prototyping (products, processes, services, and systems)

8) Exchange and assimilate the knowledge and skills needed to bring the proposed solutions to life
9) Develop or display a deep understanding of contextual issues by engaging in
dialogue with others (also other methods that may apply, such as ethnography-
based methods)

10) Demonstrate competent workshop skills, with knowledge of the appropriate
tools, techniques, methods, processes, and materials required to construct
prototypes

11) Communicate effectively, as much as possible through visual means for clarity
and efficiency

12) Construct narratives that communicate the use of design prototypes through,
for example, storyboarding or scenarios.

These are generic outcomes. For a particular intervention they should be more specific.

Similarly, guidelines on how to work with capability building and design thinking in
the complex organizational settings of academic libraries are now given.

1) Start by providing an introduction to the library leadership on design thinking
and service design, using compelling examples of real-life library issues (have
in the back of your mind the ways in which people learn (Kolb, 1983), concrete
real-life library problems, as examples, make it possible for them to relate
experiences that they have already had).

2) Systematically work on increasing and building competences. My findings
show that the role of in-house knowledge brokers is important here. Thus,
someone has to have design competences to start with, or a willingness to learn,
in order to facilitate the systematic building of competences.

3) Use, at the very start, simple activation tools, such as cards. Once people are
familiar with the process, other tools can be introduced. Changing tools to fit
issues that one is working with is important. Tools, such as cards, Giga-
mapping, semi-open templates, and workbooks are helpful.

4) Think carefully about how to facilitate the emergence of proto-practices but
allow this organic process to unfold by itself. It may take time. After some time,
people (as a collective) either pick up new practices and add to the old, or do not.

5) Do not miss good opportunities that arise, i.e. opportunities to innovate or solve problems using design thinking. When someone in the organization shows an interest in the approach, take the time to help (or design a help service for the approach).

6) Repeat and refresh whenever possible. Be pragmatic about this. Nothing should be imposed, overdone or underdone.

7) When engaging others in multidisciplinary processes, pay attention to the choice of people that make up the team. Having positive and competent participants who communicate easily is, of course, of great benefit. However, the thinking styles and kinds of knowledge they represent is also important.

8) Knowledge brokers need to keep developing their own competences (exploring, experimenting, and reading about the approach, tools, teams, practices, etc.). It is an advantage if someone in the leadership evolves into a knowledge broker.

The above guidelines also summarize and demonstrate my explanations and suggestions to the librarians from Uganda’s Kyambogo University Library on how to apply design thinking.

8.3 A reflection on limitations, future work and personal experiences

I have always had a close and passionate relationship with my workplace, the University of Oslo Library’s digital services. When I received the opportunity to undertake research on implementing design thinking in the academic library, and study how the organization could appropriate design thinking and develop design capabilities, I did not think twice. I could observe how design thinking influenced the organization over the long term, changing the way it was thinking, innovating, organizing, and strategizing.

The University of Oslo Library has indeed undergone a huge shift in the mindset and capability to engage with designerly ways of working during this time. Was this a
fluke? I do not think so. As in all real-life settings, this one is complex, and many factors may have played a role in creating a fertile ground for the library to transform. However, evidence from interviews, the increasing complexity of tasks resolved by design thinking in interventions, as well as observations at the workplace demonstrate that a great deal of learning has taken place, not by fluke, but by learning, a pragmatic attitude, and small, systematic changes in work practices.

Is it, then, necessary for the successful appropriation of design thinking, to have insiders, like me or other design thinking knowledge brokers? I have found that the answer to the second question is yes – it should be an insider, but there is a lot of room to discuss who that insider, or group of insiders, could be. This conclusion is in line with the arguments of Pandey and Srivastava: someone in an organization needs to serve as a knowledge and practice broker (Pandey & Srivastava, 2016). The successful knowledge transfer to the librarians from the Kyambogo University library, one of whom then became a knowledge broker, indicates that these insights were correct.
Conclusion

The topic that I have explored in my thesis relates to how the design thinking approach can be introduced and integrated with already existing work practices in an academic library. There is an identifiable gap between understanding design thinking and its success stories in different domains, and how to implement it in practice. My thesis contributes to closing this gap.

Selecting appropriate methods, tools, and techniques, as well as understanding the other factors needed to implement design thinking successfully in an academic library, has been the starting point of my work. In the process, three important concepts have emerged as crucial factors for success: openness, time, and dialogical spaces. Dialogical spaces are safe and inspiring communication spaces, in which a common project language can emerge. They provide a basis for the equal opportunity to participate in shaping, discussing, and articulating possible solutions for all participants. Creating dialogical spaces, a mindset of openness in all its nuances, an awareness of temporal issues, and using semi-structured and open-ended tools help to build design capabilities that can be sustained within an organization.

This thesis showcases how design thinking transformed library practices at the University of Oslo Library. My research shows how the approach, once the library’s employees gain competence in using it, offers a comprehensive way to continually revisit and renew institutional innovation strategies, visions, activities, products, and services.
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