

**THE WORK OF USER EXPERIENCE DESIGN:
MATERIALITY AND CULTURES IN DESIGNING**

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The Academic Faculty

by

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THE WORK OF USER EXPERIENCE DESIGN

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To the mundane; to the everyday.

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LIST OF SYMBOLS AND ABBREVIATIONS

ATSIR	Annual Technology, Society, and Industry Report
BOM	Bill Of Materials (list of ingredients to make a product)
ETMT	Emerging Technology and Markets Team
FF	Freemont Field (an LTC building complex)
GB	Green Briar (an LTC building complex)
HM	Hampton Mills (an LTC building complex)
LER	Lab for Experience Research (an organization within LTC)
LTC	A large computational technology company and the site of the case study
MCT	Mobile Computing Team (an organization within LTC)
MRD	Marketing Requirements Document
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
PCT	Personal Computing Team (an organization within LTC)
PRD	Product Requirements Document
RC	Ronald Court (an LTC building complex)

TAM	Total Available or Addressable Market
UX	User Experience
ZBB	Zero-Base Budgeting

SUMMARY

At the computational technology company called LTC, a large array of employees worked together to design the user experience (UX) of a variety of products. The empirical case study explores the relationship amongst the work of UX design, the work setting, and the larger strategic claims being made about the value, efficacy, and importance of design methods. The dissertation asks: *How is the activity of design reflected and constructed by a local culture and material environment?* By addressing the way designing occurs in a particular setting, the dissertation unpacks assumptions about setting and ideology within design studies and human-computer interaction. These assumptions impact the legitimacy of design as work, and challenge accepted justifications for the role of design in the development of technological artifacts. A better understanding of design work explores the proliferation of design as a general strategy for problem-solving, while questioning the agenda of this proliferation. The case study follows three accounts of UX design work at LTC. The research connects these accounts to theoretical concerns within design studies and HCI about agency, the setting of design, and the limits on design practice.

CHAPTER 1

INTRODUCTION

At the computational technology company called LTC, designers, engineers, middle managers, executives, social science researchers, marketers, and many other employees worked together to design the user experience (UX) of a variety of products. While some of these employees were directly responsible for user experience design, others were not, and worked in related, dependent, or parallel domains. Regardless of the particular domain, user experience frequented the language and activities of many employees. Beyond just using the term, user experience impacted and was impacted by the local environment and the native work activities of LTC—what work activities constituted design and what design activities constituted work were not always the same. The present research is a case study of UX design work.

The activity of design, UX or otherwise, is material and value-laden. While generalizable descriptions of design exist, a particular setting impacts what designing is and is not insofar as designing intersects with features of that setting. The case study unpacks assumptions within design scholarship—and specifically, design studies and human-computer interaction—about what it means to *do* design. By exploring the ways a particular setting both culturally and materially constitutes the activity of design, this case study of user experience design reflects on the relationship between design practice and design scholarship. Accounting for the local constitution of design work at LTC—that is, how design is materialized and embedded within a particular environment—probes assumptions found within contemporary discussions of UX design, HCI, and design studies about the ever-expanding reach of the activity of design. A more comprehensive

understanding of the activity of design offers new understanding of the assumptions, gaps, and systemic biases within discourse about design. The goal is to tangle, rather than disentangle, design with its setting.

In the setting of LTC, user experience design is the activity in question. Broadly, UX is a term that represents an ideological stance toward product development. UX emphasizes the relationship between person, product, and environment in order to more fully (that is, better) attend to needs, desires, and constraints when making products. As such, UX assembles, organizes, and narrativizes contemporary user-centered approaches to technology development and places importance on technology in context. UX aims to contextualize artifacts and individuals, and assumes that good products are those that attend to context as much as functionality. UX recasts older user-centered approaches and births altogether new ones. The activity of UX design, with all its attention to context and values, rarely explores the context and values in which it is set.

As a term, UX has—and had at LTC—a flexible referent. UX sometimes refers to a process and agenda; other times, UX refers to an outcome (such as the product itself or experience as a product); still other times, UX refers to a discipline (or set of disciplines). When UX does not stand on its own, it modifies other positions and tasks: UX design(er), UX research(er), UX management (and managers), and UX innovation. User experience is multiple: an outcome, agenda, domain, approach, input, signifier, and strategy. Rather than aim to understand the flexibility of the term user experience, the case study focuses on what UX says about the setting of technology design and development through the particulars of LTC. The contextual use of the term indicates a great deal about the assumptions underlying it. At LTC, to uncover how employees understood their role and

the roles of others in computational technology development is to understand how the assumptions embedded within computational technology become so. More importantly, the contextual use of UX demonstrated tensions between what people claimed about their (or others') work and what they, in fact, *do* on a daily basis. The gulf between doings and sayings transforms ideologies and aspirations into the materialities and cultures of work. This case study of user experience design work explores what it is to *do* user experience design, and so to connect the daily work of user experience design to its loftier goals.

User experience design work will be understood as a *practice*. In this context, practice is not the bucket of colloquial knowledge, real-world anecdotes, or non-academic activity; these meanings are often implied when the term practice is invoked in much design and development literature. Instead, practice means the routinized and coordinated doings and sayings (Schatzki 2001b) of UX design. By focusing on the activities of user experience design, the case study explores what is deemed possible, probable, and desirable in the contemporary moment of computational technology development and in the context of LTC. The constellation of *stuff* that composes user experience design—patterned thinking, methods, conversations, design artifacts, budget lines, team meetings, cubicle walls, and so on—reflects and concretizes a palette of possibilities for future technologies. As we will see, these possibilities were at once revelatory and limiting for LTC. From this case study, the particulars of LTC reflect on the contemporary domains of interaction design, human-computer interaction, and digital media. Understanding UX design work from a practice perspective entangles the latent assumptions of design with its setting in order to argue that contemporary claims that

relate design and innovation fail to attend to how setting and culture are constitutive parts of doing design.

The relationship between design and user experience, as might be expected, is not one-to-one. User experience refers to a variety of things in daily work; often user experience implies designing and designers. Sometimes user experience refers to a specific and individuated perspective on engaging with a product, service, or system: *a user's experience* or *users' experiences*. *A user's experience* can inform design when interrogated and unpacked. Other times UX refers to a broader, configured, and scripted perspective on engaging with designed outcomes, or as a design outcome itself: *the user experience*. Designers create *the user experience* in the sense they craft (with an attention to) the character of interaction. Still other times, user experience refers to a discipline and field of inquiry: *User Experience*. Designers often territorialize the discipline and field of UX. At LTC, the relationship between user experience and design was contested. More than just an association or territorialization, LTC related design and user experience through a larger initiative that restructured product development to be more user-focused. LTC introduced UX when cost, availability, and technological prowess no longer fully characterized the value of its products. In this way, user experience, design, and institutional aspirations intermingled at LTC. While user experience became a goal of project teams, it also framed strategic activities at LTC. This latter way of understanding user experience will be called a *strategic design initiative*.

Over the last two decades,¹ UX has circulated and expanded. Doing user experience design has become a complex and complicated endeavor. As the short list of already-mentioned disciplines and meanings indicates, UX requires the coordination of a variety of skills and parts of product development. In other words, user experience design is done by groups of people. User experience design is not simply controlled, done, or implemented by one individual or individual discipline; UX necessarily develops across teams. With so many parts and parties, user experience is heterogeneous—understood, respected, and conceptualized differently by different disciplines composed of different individuals. The very existence of so many competing fields vying for input into user experience design makes user experience's heterogeneity clear. Rarely within any context does everyone have the same values—groups may not share the same regard to user-centered ideals; conclusions may be contested based on their methods of inquiry or analysis; user experience may seem inconsequential to the disciplines contributing to it. In spite of this variation, UX design still takes place.

Rather than speculating or hypothesizing how and why user experience is so varied, the present study uses the setting, history, and activities of LTC as a microcosm of heterogeneous allies—peoples, resources, goals, and so much else, entangled to accomplish some seemingly solitary outcome. While a great deal of attention has been spent on theorizing or conceptualizing user experience, whether as a product or a process, less attention has been spent empirically understanding the ways the term, suite of theories, and activities exist, localize, and develop into the mundane and everyday

¹While the originary date of the term *user experience* is far from precise, a paper presented at CHI 1995 provides a rough estimate of when UX emerged as a term. Titled "What You See, Some of What's in the Future, and How We Go About Doing It: HI at Apple Computer" and co-authored by then-Apple employee Donald Norman (Norman, Miller, and Henderson 1995), the extended abstract (the paper is not in the ACM database, yet presumably existed at the time) presents the term *user experience* as a novel way to design and develop computational products in light of the complexity of use and context.

activities of work. In short, the case study focuses on UX design as embedded in the setting of LTC both culturally and materially. The relationship between the activity and the setting of design offers grounds for reflection, in part, because LTC is not a traditional studio setting. The case study focuses on the particular issues in a work environment—the materiality of work and the culture of working—that have been under-theorized within design studies, and are simply lacking from literature about design as a corporate strategy. Attending to these issues through a study of design work recasts the challenges of designing from one of creativity and innovation to awarenesses of setting and values at work.

Two Words: User. Experience.

Before delving into the work practices of user experience design, a rather mundane point ought to be made: user experience is two words—*user* and *experience*. While such a point seems pedantic, more rarely than not, definitions and discussions gloss over this fact when explaining the origins of the term. The two words that compose user experience—*user* and *experience*—pervade human-centered design and computational technology development. As such, UX is not entirely new, however, neither is UX simply a composite of existing ideas. User experience is somewhere in between.

User experience unites two key concepts in the design and development of technology. The first concept is *the user*. *The user* is a concept that marks the current, proposed, eventual, or speculative person who interacts with a product, service, or system. The user guides inquiry and decision-making in the processes of design by specifying and situating constraints, desires, and uses of a product, service, or system. In

this way, the user is an epistemological construct developed for and by designers to limit inquiry and creation. Beyond the functional purpose of knowing what to make, the user is an ideological concept that has roots in early Twentieth century humanism. Design theorist Richard Buchanan explains that design became aligned with broader humanist ideals of individual freedom, aspirations, and agency in response to the conquering impulse of the Industrial Revolution. (Buchanan 1995a) Buchanan's observation points out that design and humanistic agendas are not one in the same. From this humanist tradition, the ultimate goal of design is supporting the needs of people. While the term user (that is, rather than human) muddles this ideological position, the user invokes a sense of perspective, ownership, and responsibility in the creation of products.

The user is commonly associated with the ideas of user- or human-centered design. Design practitioner Jon Kolko explains that "[t]he process of human-centered design relies heavily on modeling target users in an effort to create a prototypical audience for design. A model is a representation of a real thing, and a model of a user is a representation of a real person." (Kolko 2010a) For Kolko, the user is *the* formative construct underlying user-/human-centered design, a position seconded by fellow practitioner Dan Saffer. (Saffer 2007) Buchanan comments that the reductive nature of the term user is problematic as it assumes a humanistic agenda insofar as a human abides by the terms of use, broadly construed. (Buchanan 2001b) While this debate is important, the salient point is that *the user* is a historicized and debated concept. While the user pervades discussion within design, it is not the only way to orient design. The user (human or otherwise) provides a sense of scale (the individual) during the creation of

products. As we will see, this scale can be problematic when used in circumstances when scalar differences are difficult to articulate and to reconcile.

The second term and concept is *experience*. Experience is meant to indicate the current, proposed, eventual, or speculative character of using a product, service, or system. Within technology design and development, experience has a shorter and less wide-reaching history. Within HCI and design studies, definitions of experience span interests from holistic perspectives and lifeworlds (Hassenzahl 2008; Forlizzi and Battarbee 2004) to more narrow discussions of the emotional and affective register of products. (Battarbee and Koskinen 2005) Across these definitions, experience emphasizes embodiment and context when considering the scale of use. The particular meaning aside, the rise of the term experience coincided with the emergence of phenomenological approaches to the design of computational systems. (Harrison, Tatar, and Sengers 2007) In particular, experience challenges the sufficiency of notions like utility and usability by probing the ways we live with products rather than just accomplish tasks with them. Where the user is an embodied entity and identity, experience is dynamic, temporal, and contingent. Experience tangles the needs, desires, and aspirations of users in the world through—and sometimes in spite of—the objects, environments, and interactions users have. The term experience embodies ideas beyond tasks, work, or process, and encourages conversations of *living with* a product, service, or system over time.

Together these two terms—*user* and *experience*—compose the noun *user experience*. UX exceeds the sheer sum of its parts, and cannot be simply traced to the emergence of one or the other term. User and experience are in tension within their composite. The user seems to reduce humans to the terms of products, and experience

seems to humanize products by situating them within the world. In short, user experience is a term in its own right that cannot be completely separated from its parts.

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*You can't just say user experience; you have to say user experience **something**. User experience research. User experience design. User experience by itself is really too vague to be anything. User experience is the experience a user has. [...] Like "What do you mean by user experience?" User: Experience. [laughs] [interview with Nolan (11.07.2013), user experience researcher in Lab for Experience Research (LER) at LTC]*

User experience is exactly what the word says: the experience of the user. [...] That is user experience. [laughs] Now, on it's own it means nothing. [interview with Katrine (11.05.2013), user experience researcher in Personal Computing Team (PCT) at LTC]

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While there is an obviousness to the term, as both Nolan and Katrine point out, the obviousness of user experience is precisely what leads to its vagueness, or, more precisely, its vastness. In many ways, user experience *is* just that—*the experience a user has*. UX does not veil itself as something unnameable. However, what user experience lacks in complicatedness, it certainly makes up for in complexity. *The experience a user has* is multi-valanced and vast, shifting with the user over time and across settings. Capturing, quantifying, qualifying, and acting upon *the experience a user has* is a rather difficult task given that such an experience is subjective, context-dependent, tacit, and dynamic in time and space. Even more, the apprehension of another's experience may, for all intents and purposes, be impossible. Adding these two concepts together has a combinatorial effect—*who are the users? what experiences do they have?* Even asking simple questions such as *what aspects are important to pay attention to with regards to a user's experience?* is not without problems.

User experience design is, then, paradoxical. First, UX *is not* complicated in certain ways. It is legible and understandable in broad ways, and shares language with which many are familiar. Second, UX *is* complicated in certain ways. It is not legible and understandable in many particular ways, and is often used and invoked in ways with which many are unfamiliar (or told to be so). Again, UX is in tension, and this tension motivates the case study. Between the specific and the general is the actuality of user experience. In short, user experience is many things at once without being anything singular. While the literature dealing with user experience spends a great deal of time defining and bounding the term—a clear recognition of its vastness and complexity—user experience, when observed in use, is always in tension.

Seeing UX Design

I did not come to realize this tension within user experience through literature. Instead, I witnessed the ambiguity, confusion, and conflict of what user experience means and does in person, firsthand, and through work practices. The following observations of UX design took place in the Summer and Fall of 2013. I interned at LTC, a large computational technology corporation, as a user experience researcher within a business group that focused on developing personal computing systems. This group was called the Personal Computing Team (PCT). Unlike many internships within LTC, I was not given a position slotted for interns. Instead, I was brought into a position that had previously been vacated and unfilled by a junior user experience researcher. As such, being an intern was more titular. Beyond being an intern at LTC, I came to this setting as a researcher to observe the daily work of UX practitioners.

I came to LTC with a general idea of what it meant to be a user experience researcher. I assumed I would run user studies, engage in field work, and communicate with design teams in order to inform their work. While these activities certainly occurred, I quickly realized that being a user experience researcher (and being a user experience practitioner more broadly) was not as self-evident as one might assume. Often I asked *Am I doing user experience research right now or is this just work?* The obviousness of what user experience meant differed greatly from the obviousness of why LTC cared. For LTC, UX held the promise of *differentiation* in the saturated personal computing market, and *innovation* in the rapidly changing computational technology market. Moreover, both what UX was and why LTC cared differed from what it was to engage in doing the work of UX design. But more than just understanding the value of UX within this corporate setting, I found the daily work of UX design (of which UX research was a part) engaged in many activities that typically were not found in descriptions of user experience design—traveling between sites for user tests and design meetings; extra-curricular planning meetings; conversing on an internal forum; impromptu teaching moments in the back room of user studies; strategizing on how to edit videos of user studies; making (and remaking) presentation slides. I came to LTC with a sense for the role of user experience researcher and I found that doing the work of user experience design often did not appear as I had anticipated. Beyond the tasks that might be called "just work," user experience design took on particular aspects of the setting of LTC.

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User experience ultimately is how an end-user responds [and] reacts. [It's] more of an emotional connection with the product or service they are interacting with [...and] to what extent, you know, that underlying product or service addresses a known need or a hidden need. [interview with

Martin (10.23.2013), product team manager on Personal Computing Team at LTC]

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To a large degree, I should have anticipated that UX design would look different on a day-to-day basis. LTC was not a typical setting where one would hear the term *user experience* thrown around so commonly. In this regard, LTC was particularly intriguing. As already mentioned, user experience focuses a great deal of attention on the end-user—the person who engages with, connects to, and builds opinions about a product. The goal, in a rather simple way, is to understand the lived realities of a person to create products better suited for these realities. Logically speaking, for a company to care about the end-user assumes the end-user cares (or will care) about the company too. *Care*, in this context, might only mean *notice*. Companies invest in understanding their customers to deliver something of value to them. This is where LTC differed. As much as LTC is known, the company did not make consumer electronics, but instead made *ingredients* for consumer electronics. LTC manufactured components—hardware, supporting software, and skeleton of systems, all of which everyday consumers interact with under the name of an original equipment manufacturer (OEM), that is, a computer brand. In many ways, LTC's users were other companies and not end-users in the more common sense or in the way user experience discourse tends to understand end-users. User experience focuses attention on those people who will eventually use a system. For LTC, the end-user engages with its hardware, software, or other technological innovations only in a secondary way. LTC's products are embedded in systems. *The experience a user has* was not something that LTC had much control over in the end.

The fact that LTC, an ingredient company, focused so much on the end-user leads to a simple question: *What does user experience as an idea, suite of methods, and general approach to technology design and development offer LTC?* This question can be stated differently: *Why does an ingredient company consider the end-user when the insights have hard-to-place effects on its products?* In this respect, this case study of user experience design work is idiosyncratic in two ways. First, while user experience design is not new, it was in the context of LTC. Second, while user experience design has a place within the design and development of technology, LTC's particular products and activities are atypical in the discussion of user experience design. In sum, user experience design means something very different in this context.

An answer to these questions can be surprisingly straightforward, if still puzzling. LTC invested in user experience design because, as a company, they believed that accurately knowing and predicting how a product will be used and adopted by consumers leads to the success of that product. As such, user experience structured organizational activities to give LTC an edge, or, in the prevailing language, *differentiate* LTC amongst its competitors. By thinking ahead, LTC hoped to stave off becoming just another ingredient company. Beyond thinking of user experience design as an isolated activity, LTC instituted user experience as a company-wide initiative. All parts of LTC, from transistor engineers to market strategists, needed to consider the user experience.

The problem with assuming UX design does what LTC claimed is that, as an employee, it was hard to decipher that UX design did any such thing. As much as good design aids in successful product development, user experience design functions at a scale that was different than LTC's direct customers and LTC's products. Again, LTC

made ingredients for computational systems. Unlike cooking ingredients, computing ingredients are assembled (for the most part) prior to being sold to an end-user. Conversely, UX can impact hardware at the ingredient level, but often in a convoluted way when the unit of assessment is the system as a whole. For those elements that were thought of as designed experiences—a bundle of usages and interactions—LTC could propose elements, but could guarantee these were implemented as-is.² In some instances, LTC partnered with their customers to co-develop new products, but in many ways the user experience design came from the collaboration rather than the design of LTC's ingredients. To claim LTC made better products because of user experience seems misleading.

As much as user experience offered potential new avenues for the next generations of LTC's products, so too did engineering. LTC made ingredients in an engineering-heavy tradition: their ingredients followed a rather predictable trajectory of being smaller, faster, and more powerful. The next generation of products aimed to cannibalize their previous generation, making them a hallmark of industry leadership. In this different way, UX did not determine LTC's products, at least not single-handedly. Certainly UX-driven decisions impact hardware, yet only within the constraints of physics. While LTC has been known for making the best ingredients in the market, the inclusion of these ingredients within finished computers might be more accurately

²Chapter 6 focuses on the creation of the UX Council, a central body to regulate and oversee user experience design activities at LTC. Amongst a few unrealized aspirations, the UX Council, as explained by one of its core members, aimed to develop industry-wide metrics and benchmarks that took into account user experience requirements and usages. While these metrics and benchmarks had yet to be developed at the conclusion of my field work, the very premise of such measurements can be seen as a tactic in response to LTC's precarious position. As LTC has little direct control of designing the final user experience, metrics and benchmarks would provide a way for LTC to exert control when their ingredients had been sold through business-to-business warranties.

attributed to LTC's heritage of rigorous engineering. Even in recent years as LTC's position has waned, engineering feats have been central.

The case study focuses on how work narrativizes the role of user experience design by connecting it to agendas, outcomes, and values. The previously stated mismatches are not to claim that LTC's employees were ignorant or naive. Instead, the goal of the case study is to understand how the daily activities of user experience design connect to this larger narrative in and through work. In other words, the goal is to not take for granted whether UX design does or does not accomplish its goal in some market sense, but instead how (and so why) LTC theorizes this role through activity. The success or failure of products or projects are not at issue. As will become more apparent, the assumption that UX design leads to better products will not be taken as self-evident nor even as accurate. Instead, these causal relationships will be situated, contextualized, and materialized. In doing so, ideas like differentiation, innovation, and customer value—those are the justifications LTC gives for UX—can be linked to everyday and mundane decisions of doing user experience design work. As such, the company's goals of market definition, end-user value, and leadership are not viewed as outcomes or goals, but as culturally defined narratives. UX design was not only a way to differentiate LTC's products (if it was that at all), but also a way to narrativize its products as vital to its customers, consumers, and end-users. More than a product development process, UX design was an institutional development process, forcing the reconceptualization of what it meant to design and develop ingredients through work. UX design was done at LTC in the negotiation of tasks, institutionalization of roles, and mobilization of language rather

than solely in some product development outcome. UX design forced institutional change that ultimately led LTC to engage in new types of working and value new types of work.

All of this is not to say the attention to user experience was meaningless and has no bearing on actual product development; in fact, quite the opposite was true. User experience research and design offered both insight and direction for LTC; what is unclear was insight *into what* and direction *to where*. Even more, the research points to an institutional dilemma that places emphasis on work seen as creative versus work seen as rote. The difference in the contributions of various types of work was what was at issue in the end for daily UX design work, and the implications of assuming one group or discipline controlled these contributions altogether.

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[User experience] is the by-product of putting something into the market that fulfills a user's need in a way that enables technology to be transparent and experience to be at the forefront. That's what user experience is to me. And that's all aspects of integration, hardware and software. [interview with Brian (11.05.2013), metrics researcher in R&D Labs at LTC]

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A Case Study of User Experience Design and UX Design Work

This study could be undertaken from a variety of disciplines—from microeconomics, from business, from management, or from science and technology studies, to name a few. While these fields may seem appropriate in some ways, the present research approaches the context of UX at LTC through the fields of human-computer interaction (HCI) and design studies. User experience originates from HCI, at least in the terminological sense. (Don Norman, Miller, and Henderson 1995) In this way, HCI offers a wealth of foundational and emerging literature about the topic, and is a site

for an ongoing discussion about the professional and academic study of user experience design. For example, a simple database search of the Association of Computing Machinery (ACM)—host of the seminal annual conference on HCI—reveals more than 11,200 works contain the term *user experience*; UX draws a little over 9000 works (probably with significant overlap). While the ACM as a whole is not an HCI organization, a vast majority of the ACM's conferences and journals fall partially under the classification of HCI. Conferences with titles such as *The International Conference on Design, User Experience, and Usability*; *Designing for User eXperiences*; and *the European Conference on Cognitive Ergonomics: Designing beyond the Product, Understanding Activity and User Experience in Ubiquitous Environments* all fall under the purview of the concerns of HCI.

In the same respect, approaching user experience from the theoretical background of design studies fits the lineage of discussion about user experience design. While much of the discussion about UX, within HCI and more widely, seems to be a matter of design, design is by no means the only activity productive of the user experience. (Donald Norman 2003) As much as design does not encapsulate the entirety of the work of UX, the field of design studies allows entry into questions with regards to user experience that other fields overlook. For example, important to design studies is the manner through which designers represent and understand conditions through depictions—models, sketches, prototypes, storyboards, and the like. Numerous studies have tried to quantify and qualify design in terms of a cognitivist summation of designing, where depictions are but manifestations of internal states. (Andersen 1983; Baker and van der Hoek 2010; Ball, Onarheim, and Christensen 2010; Cash, Hicks, and Culley 2013; Göker 1997)

These studies, at best, highlight the particulars of various design practices within broader processes of design and development—software, architecture, or engineering—yet miss the ways designing depends on the content of the process—software for filing taxes, architecture for schools, or engineering for air conditioners. While the subject does not fundamentally change the nature of what is or is not designing, the subject does fundamentally change the depictions designers make and use. The challenge is to understand the way a particular setting makes *designing* into *working*. The present case study offers a new direction for design studies that moves away from studying the design process to studying the work sites and cultures of designing.

These two disciplinary pillars also provide a third collective insight into this case study. In recent years, practitioners of HCI and interaction design have found their roles within teams changing. HCI and interaction design (and design more broadly) has become a frame for doing technology development. From these disciplines flows a prevailing structure for how teams should operate in order to develop products. At LTC, user experience design was supposed to function in this way. The case study aims to unpack the value-laden ways that user experience design functions, and does not, to scaffold product development.

The research is undertaken as an ethnography of practice, or what Annemarie Mol calls a *praxiography*. (Mol 2002) The research methods (ethnographic participant-observation, semi-structured interviews, and artifact analysis) and unit of analysis (practice) were chosen to connect micro- and macro-activities at LTC. On one hand, LTC argues that UX design is fundamental to producing innovative products. UX design leads to product differentiation in terms of what a product enables (i.e. the experience) rather

than in terms of its cost, availability, or technical prowess. These latter characteristics are not enough to distinguish LTC in a competitive market. This macro-view was found in the language of employees. While this language followed a logic, its execution was opaque. On the other hand, user experience design was found in the day-to-day activities of employees. As employees invoked the macro-view of UX, they also engaged in work to bring that narrative into being. Carried out through mundane tasks, routine meetings, and laborious activities, this micro-view serves as a type of embedded theorizing (Caldwell 2008) of how the opaque macro-view was brought into existence and visibility. This underlying rhetoric was located in what people did, said, and made, and was found in the definition of products and the institutional practices of UX design. These two views of work co-exist and co-form. The study looks at the co-dependence of these types of activities, and does so through their embodied and performed manifestation.

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User experience is a project that represents people in the design and development of an organization. Becomes kind of the vehicle through which people are represented to a company. Right? But that secondly that um also a project that brings attention to the assumptions that a company makes about people as they as they engage those processes of design and development. Right? And those are two complementary and competitive projects. They're not just complementary but they compete because they align with people and the corporation in different ways as a function of each. In the first case you are aligning very tightly with the corporation, right, and you are looking to bring people into that tight alignment. And in the second case you're kind of putting the corporation at more of a distance and saying that the tight alignment is with people and to bring that alignment back to the corporation. [interview with Audrey (10.28.2013), user experience researcher in Lab for Experience Research at LTC]

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The study can be motivated by the following question: *How is designing embedded in a particular setting?* By embedded, I mean how does the activity of design reflect a local culture and material environment. The gaps between working and designing offer glimpses into this localization process. Addressing this question provides insight into the assumptions embedded in design scholarship about how design occurs. As we will see, user experience design as understood through practice is more of a negotiation about visions and environments than it is a masterful or single-minded set of activities. User experience was a term in which many parties staked claims. The goal is not to validate what is proper or correct, but to understand how the particular circumstances of LTC illustrate latent assumptions and gaps about UX design and where it occurs.

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Hailey [(09.30.2013) product engineer in R&D Labs at LTC]: *So it turns out that ethnographers were the first kind of...first people that were hired into [LTC] [...] to bring this user experience [pause] kind of discipline to [the company]. And that ethnographers aren't really user experience people.*

Thomas: *What do you mean by that?*

H: *Um...*

T: *I sort of know what you mean by that, but...*

H: *Well, they don't actually tie anything to the design of the products.*

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As such, user experience provides a lens on contemporary rhetorics of design, innovation, and contemporary product development. In recent years, a broader wave of design-related terms and ideas have grown in prominence like user experience—user-

centeredness, design thinking, radical innovation, creative intelligence, AGILE development, and Lean organizations, to name a few. Flowing from the second internet boom, such terms have seemingly inundated all technology companies with a desire to be light, fast, flexible and dynamic within a rapidly changing market. All companies seem to have the tagline: *We orient toward user insights, product differentiation, and market disruption*. As a dominant contemporary rhetoric, one that implicates user experience design (at least in the context of LTC), little has been done to understand the progression of this thinking in the particular contexts of its use. The narrative that claims design leads to innovation is often assumed—that is, made commonsensical—within contemporary business culture. User experience indexes this commonsensical assumption, and so offers a way to unpack a combination of macro- and micro-activities.

Outline of Case Study

The case study is made up of three empirical accounts of UX design work. The accounts were selected less because they accurately represent the whole of doing the work of user experience design and more because they highlight particular key tensions of that work.

The first account focuses on a product development process for a concept system. The team was tasked with developing a system that embodies the emerging fringe of personal computing. The project ran into issues as timelines for execution were too short. On the team, the timeline and its expectations revealed a tension between the metaphors used to guide work. The term *holism* meant very different things for parts of the team, and led to overlapping and flagging work.

The second account focuses on the creation of a central body to oversee and manage user experience design within the internal personal computing organization called PCT. The UX Council came from an internal report that identified a lack of institutional coordination across teams within PCT. While the UX Council seemed like a straightforward institutional body, the planning team struggled with how and when user experience oversight needed to occur, and what constituted the core activities of coordinating user experience design. The UX Council negotiated its own processes at the same time as trying to convince various teams that oversight was important. This account highlights a tension between user experience design as professional activity and user experience as an institutional activity.

The third and final account focuses on the ways user experience was leveraged to make decisions. In final effort to rekindle a cancelled software project, a software team decided to do a final user study. The user study aimed to illustrate the worth of the project. Zeroing in on the relationship of proof and budgeting at LTC, the account highlights the tension between existing and emerging ideologies within the organization. This account questions the ways user experience functions as a strategic design initiative through the concept of custodianship.

These accounts highlight the ways design occurs through and in a particular sociocultural environment. As such, design will be shown as having a materiality (distributed into the environment itself) and requiring a particular set of shared values (a culture of designing).

CHAPTER 2

THE COOLING OF DESIGN

OR, WHEN DID EVERYONE* START TALKING ABOUT UX AND DESIGN?

(*CERTAIN PEOPLE)

Within the last two decades, design and user experience have grown abundantly present in colloquial language. Design appears in popular magazines,³ business journals,⁴ and management publications;⁵ design is the subject of documentaries,⁶ broadcast television,⁷ and biopics;⁸ design is a commonplace marker of luxury⁹ as well as of utility and usefulness.¹⁰ The meaning of the term *design* varies widely in these appearances, often acting as a marker of something commonsensical without unpacking how design might be different than other similar or related activities. Likewise, the concepts of user experience (UX) frequently color the descriptive language of design. UX proposes a comprehensive and aspirational approach to historically task-oriented technology development. Often related to computational technology (where the term *user* is native), UX increasingly bleeds into broader discussions related to brand image, corporate management, and customer service (Jun 2008; Terrey 2009; Veryzer 2002; Bucolo, Wrigley, and Matthews 2012; Yin et al. 2010; Rajabalinejad and Spitas 2011) (along with

³Magazines from *Wired* (Oct. 2014) to *Bloomberg Businessweek* (March 2014) to *T* (the weekly New York Times style magazine; yearly since 2008) have published issues exclusively on design. While these magazines mean different things by design, the occurrence of the term in these settings is worth noting.

⁴Two examples are Leonard and Rayport. (1997) "Spark Innovation through Empathic Design." and Brown (2008) "Design Thinking." both in *Harvard Business Review*

⁵*The Design Management Journal* (published by Wiley) and *Managing as Designing* by Boland and Collopy (2004)

⁶The films *Helvetica* (2007), *Objectified* (2009), *Urbanized* (2011) directed by Gary Hustwit

⁷IDEO co-founder David Kelley interviewed by Charlie Rose on *60 Minutes* (01.06.2013); "The Deep Dive: One Company's Secret Weapon For Innovation" on *Dateline* (02.09.1999)

⁸*Jobs* (2013) directed by Joshua Michael Stern

⁹For example, the phrase "designer eyewear" transforms the term designer from a noun into an adjective.

¹⁰The commonplace mention of something being "well designed."

altogether odd¹¹ discussions). Like design, user experience offers a fruitful conceptual language for thinking through diverse settings where products and people come together.

This chapter provides grounding in design scholarship for the subsequent empirical accounts, with particular attention to notions related to the activities of design and the way design scholarship addresses the context of these activities. The first goal of the chapter is to articulate my present research's commitments within design theory and design studies. In particular, my approach aligns with discussions of design as a propositional activity, or, as it will be called, design-as-proposal. This tradition underlies how the empirical accounts are understood. In short, design-as-proposal means that designing simultaneously produces knowledge (i.e. inquiry), proposes outcomes (i.e. synthesis), and negotiates the boundary between the knowledge and outcomes (i.e. reflection). These activities are not neatly ordered, yet together produce proposals for products, services, or systems through their interplay and tension. (see Figure 1) Their entangled, cyclical, and iterative performance is what I refer to as *designing*.

¹¹In an interview with the podcast *Inquiring Minds* (04.17.2014), Jared Diamond referred to a young adult version of his book *The Third Chimpanzee* as "making [it] more user-friendly."

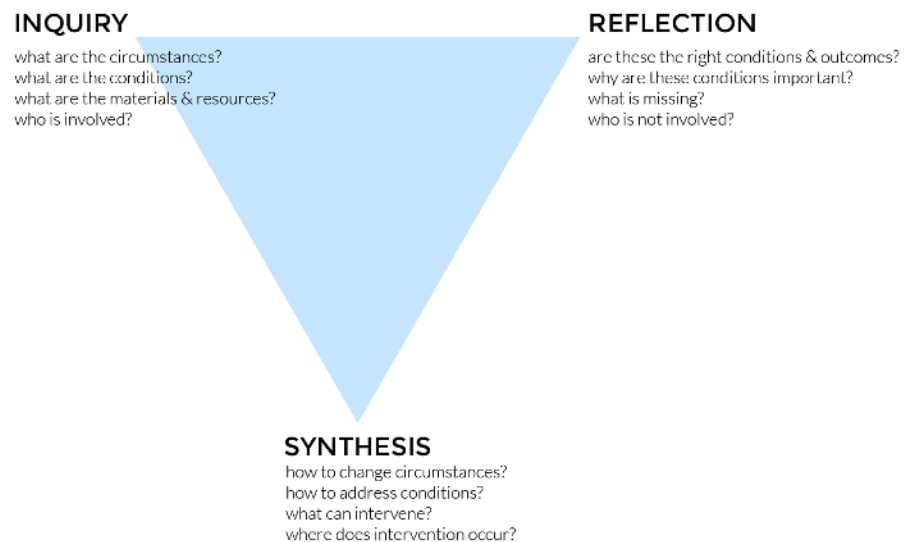


Figure 1: Design has three main activities—inquiry, synthesis, and reflection. These three activities orient toward the formation of proposals for products, services, or systems.

The second goal of this chapter is to place user experience design within the theoretical and practical literatures of design in order to build adequate grounding to understand the rise of strategic design initiatives. This chapter frames the emergence of ideas like user experience and strategic design initiatives within the history of design scholarship, locating these two terms within a trajectory of thinking related to the scope of design. While these terms are not exclusive to design scholarship (and in many ways are becoming less exclusive as already mentioned), the present work traces their appearance and discussion from within design scholarship. Two threads ground the discussion of user experience and strategic design initiatives from within this domain:

(1) The view that (user) experience—and not the object, service, or system—is the product of design. The rise of computational technologies as so-called information technologies elevated the immaterial aspects of products. These technologies and their advocates reformulated the relationships amongst stages of design, development, and use, and so designers, products, and users. As such, the outcome of design is the construction of environments or contexts rather than any single material object. (A. A. Moles 1996; A. Moles 1985) This view challenged designers as form-givers—what is the *form* of information and how do designers produce outcomes that are manipulable, unfinished, or remade in use? One response is that designers do not make objects, services, or systems as much as constitute experiences, or, moment-by-moment constructed encounters.

(2) The necessity of design (i.e. inquiry, reflection, and synthesis) at and across various levels of complex systems. With the professionalization of design in corporate settings and the ever-increasing complexity of products, services, and systems, designers argue that design is important at many, if not all, stages of product development. In these stages, design functions as the planful eye of synthesizing and negotiating the various aspects of technical, business, and customer constraints. (Pugh 1991; Donald Norman 2003; Brown 2009) Combined with the views that experience is the product and that design is a type of thought process, advocates argue that design is well-suited to manage and coordinate indeterminate complexity at the corporate level. In this coordination, various production activities—those activities tasked with executing upon the strategy—are often framed in a language that neuters their status as contributing to the creative direction of a product, service, or system.



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In iOS 8, you'll find a convenient new way to respond to notifications. Helpful shortcuts to the people you talk to most. And time-saving features for managing your mail. All of which make the experience of using your iPhone, iPad, or iPod touch that much better.

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Figure 2: "Details make the experience." ("Apple - iOS 8 - What's New" 2015, <http://www.apple.com/ios/whats-new/>)

These two arguments are constructed from notions within design that the activities of design are universal, topic agnostic, and scalable. For example, design scholar Herbert Simon writes:

Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. [...] Design, so construed, is the core of all professional training. It is the principle mark that distinguishes the professions from the sciences. (Simon 1996)

As will be shown, other scholars (Buchanan 1995b; Nelson and Stolterman 2003; Krippendorff 1989; Dorst 2006) express similar sentiments. While the generalizability of design offers a productive discourse, a portion of this discourse conceptualizes design as a type of thinking or cognition. Such a conceptualization neglects the material activities that also constitute design by neglecting to understand the relationship between the setting and the activity of design. In short, this chapter highlights the ways these definitions provide room for ideas like user experience and strategic design initiatives, while simultaneously under-theorizing the materiality of these ideas. The case study

explores the production of gaps in these abstractions of design through concerns of the materiality and culture.¹² By outlining the landscape of these ideas, the chapter concludes with particular unanswered questions about the materiality and cultural assumptions of design.

Revising a history, or, unmaking commonsense

A brief example provides some context for the following literature review. Figure 2 and Figure 3 are screen captures from Apple's iOS 8 website (accessed April 5 2015). The website explains the various features of the new operating system and is geared toward a general audience (though presumably customers and potential customers of Apple). Under the heading "Design" (Figure 2) are three images of iPhones in the middle of various actions. The left image shows a phone receiving a text while also viewing or taking a photo; the middle image shows hidden actions when swiping an email message to the left; the right image shows frequent contacts in an applications menu. The header copy reads "Details make the experience. These details make it brilliant." ("Apple—iOS 8—What's New" 2015) The explanatory copy mentions these depicted features in a general way, and concludes by saying the various features "make the experience of using the iPhone, iPad, or iPod touch that much better." ("Apple—iOS 8—What's New" 2015) The purpose of this section is to communicate Apple's precise and deliberate attention to making products better through subtle details, that is, through the *design* of this operating system. The word *experience* expresses that the various designed details fit together in a cohesive manner. This image presents an example of user experience and UX design.

¹²While not direct, materiality and culture correspond to the notions of *habitus* and *doxa*, respectively, advanced by sociologist Pierre Bourdieu. In his text, *Outline of a Theory of Practice* (1977), Bourdieu introduces habitus (the material environment) and doxa (commonsense or prevailing-and-unquestioned assumptions) to explain how coherent social orders emerge from activity. These terms will be further unpacked in Chapter 3.

First, user experience is the overall impression of a product. Second, UX design is the deliberate activity of crafting that overall impression. In order to design the user experience, one must attend to details as much as their combination. Third, user experience design, when done well, distinguishes a product amongst its competitors and in the eyes of the user.

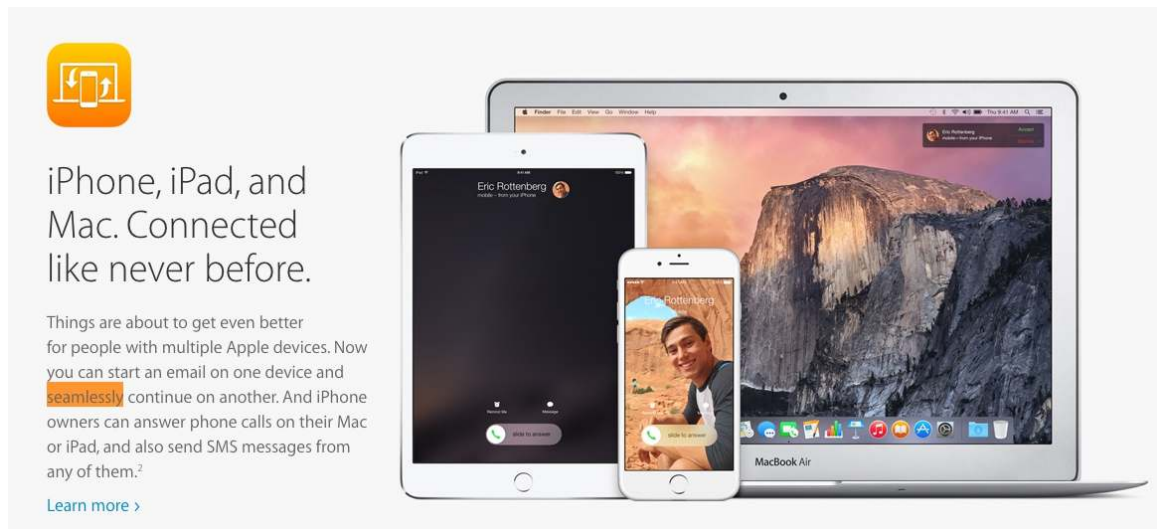


Figure 3: "Seamlessly continue." ("Apple - iOS 8 - What's New" 2015, <http://www.apple.com/ios/whats-new/>)

In the second screen capture (Figure 3), three devices—a smartphone, a tablet, and a laptop computer—are shown receiving an incoming call. The copy explains that the new operating system will allow for easier communication between multiple devices that perform the same or similar tasks. One sentence reads, "Now you can start an email on one device and seamlessly continue on another." ("Apple—iOS 8—What's New" 2015) The term *seamlessly* expresses that when tasks potentially span multiple devices (such as email), the transition between devices is now uninterrupted by platform dependencies. The point of this section is to show that cross-device coherence and consistency were goals while developing this new operating system. This section invokes another idea related to user experience design: action (e.g. emailing) is separate from its application or

platform (i.e. email on a laptop, tablet, or smartphone). In this example, a phone call can be answered on whichever device is most readily available. The images show this action through a notification that appears on each device for the same call. The focus of UX design is less on the devices or operating system *per se* and more on the activities and actions allowed by this technology. The operating system is a means to act. The operating system, in both figures, is depicted through what it *enables* rather than what it is *capable of*. These examples provide glimpses of user experience design. More than identifying the pervasiveness of language, the present case study connects outcomes like cohesive, detailed-oriented products and seamless actions to the work of producing such outcomes.

Large-scale user experience design marks a major shift within design studies and HCI. As might be self-evident already, user experience design requires the coordination of a variety of disciplines and stakeholders. In large companies that produce complex products, such as operating systems, user experience design is a complex organizational endeavor that extends beyond a single group and single project. As such, user experience design is a professional activity, a distributed capability, and, at times, an organizing principle of a company. As a strategic organizing principle, design falls under a variety of names, and is not exclusive to user experience design—managing-as-designing (R. Boland and Collopy 2004; Liedtka and Parmar 2012), design-driven innovation¹³ (Acklin 2010; Verganti 2009; Utterback et al. 2006), design thinking (Brown 2009; Lockwood 2009), total design (Pugh 1991), (radical) innovation design (den Ouden 2012; Cruickshank 2008; D. A. Norman and Verganti 2014), and still others. I refer to this idea as a *strategic design initiative*. In the simplest terms, a strategic design initiative utilizes

¹³Utterback et al. (2006) do not use the exact term *design-driven*. Instead, the authors refer to "design-inspired" innovation. The difference between the terms is purely nominal.

core concepts of design (mainly design thinking) to structure strategic activities on the organizational scale. Design serves as both a metaphor for organizing work—an approach to projects and corporate strategy—and an activity to structure work—a procedural approach to engaging in projects and corporate strategy. Strategic design initiatives valorize the creative potential of design by emphasizing the ways the methods and approaches of design structure inquiry, synthesis, and reflection. Strategic design initiatives imply a variety of possible ways to understand design, especially when considering changes in scale and cross-organizational coordination. Beyond the creative potentials of a designerly approach, strategic design initiatives leave a great deal unanswered. A main thrust of the present research comes from understanding some of the many organizational and institutional activities that are also part of such initiatives. Particular attention will be given to those activities that fall outside of the purview of designing, such as disseminating knowledge and setting standards of practice.

Three main concerns motivate the subsequent literature review. First, strategic design initiatives call into question the scale of design practices as well as the foundational unit of the user. Where form and materials constitute the base of industrial/product designers, or where interpersonal interactions and workshop-based interventions constitute the base of participatory designers, or where moment-by-moment psychological states constitute the/a base of interaction design, strategic design initiatives function at a scale that integrates and interrogates the business as much as its offerings, seeking to integrate a unified direction across many layers and disciplines. While some of the activities of strategic design initiatives are familiar to design studies and HCI, many are not. As such, the first concern that motivates the literature review relates to the

materiality of design. Other than the coordination of discrete design activities (that is, the proliferation of design specialities within a company), what unifying materials compose and construct strategic design initiatives?

Second, the scale of strategic design initiatives implies that those in charge of design are not necessarily people called designers. As a result, new practitioners and practices emerge. With regards to user experience design, the relevant skills and capabilities are expansive, implying the coordination of multiple practitioners from different design disciplines. Even more, disciplines other than design—engineering, marketing, business strategy, and human resources, to name a few—must be coordinated to accomplish UX design. At LTC, the coordination of disciplines and activities was done through the construct of the user experience of the product, which implied an entire ecosystem of products, activities, and people. As such, the concept of *the* designer changes dramatically. The second motivation for the literature review is understanding what the activity of design entails such that strategic design initiatives might be considered design.

Lastly, in considering the usefulness of design beyond look-and-feel, the term *design* and many related terms appear in new contexts. As such, these terms come to denote new things. While some disciplines of design have long traditions of design as a comprehensive function, only recently have such ideas found export to other domains. In these settings like LTC, *design* carries a great deal of assumptions, and can come to be understood as multiple things. In this multiplicity, what design actually *is* is less consequential than what design comes to be. Exposing the landscape of the term *design* opens up discussion of how the activity and its purposes may lack explicit and/or implicit

support. The third motivation for the literature review is understanding the relationship amongst the ideological and procedural components of design.

To reiterate, this chapter aims to place user experience within the theoretical and practical literatures of design, and build adequate grounding to understand the rise of strategic design initiatives. The literature focuses on two threads that connecting user experience design to strategic design initiatives. The first thread is the view that (user) experience—and not the object, service, or system—is the product of design. The second thread is the necessity of design (i.e. deliberate and planned action) at and across various levels of complex systems. In exploring these threads, this chapter posits that the universality of design presumes particular materialities and ideologies underlie action. In the empirical accounts this idea is supported with by exploring the socio-materiality of design activities.

Clarifying Terms

For the purposes to starting an inquiry into the terms *design* and *user experience*, a few auxiliary terms need definition and distinction. The term *design* can refer to the field, domain, skills, sensibility, logistics, and a whole slew of other aspects of the planning activities that set products, services, and systems into production. Here the activities of design are the focus—that is, the focus is on *designing*. As such, design will be understood as a *practice*, a term coming from the sociological study of constructing social order through everyday life (Bourdieu 1977; Shove 2005; Schatzki 2001b).

Framing design as a practice—an activity that has rules, norms, and causality—positions design within an ongoing discussion with regards to design, HCI, and practice (Disalvo, Redström, and Watson 2013). This ongoing discussion focuses on the construction of

order and routines, with the explicit aim of producing new orders and routines, or, as Kuijer et al. discuss, taking practice as the unit of design. (Kuijer, Jong, and Eijk 2008) Unlike what Kuijer et al. discuss, the present work takes practice as a unit of analysis (i.e. the unit of design studies) to unpack what designing looks like in contexts that are unfamiliar or unrecognized as design contexts. The concept of practice implies a particular focus on the activities, objects, people, and resources that compose designing. Moreover, the focus on practice aligns with critique that contests design as a largely cognitive activity, most emblematic in the term *design thinking* (Brown 2008; Brown 2009) and *creative intelligence*. (Nussbaum 2013) The subsequent accounts (Chapters 5-7) contest cognition-forward definitions of design by highlighting the contingent, situated, and specific activities of designing.

Practice, in the sense so far discussed, should not be confused with the poorly defined term *design practice*. This term commonly refers to professional design work or the material and embodied activities of design. Design practice often complements design cognition. Design practice tends to be a category in academic discussions to communicate a realist approach to theoretical work, and so brackets professional designers from academic designers.

For the sake of simplicity throughout the following writing, the term *product* refers to the outcome of design. This outcome can be a material product in the literal sense, or any service, system, plan of action, digital object, or other designed outcome. These outcomes are all considered *products*. This loose definition of product serves a rhetorical point. The term *product* reinforces the relationship between the design

profession and market value,¹⁴ as well as that design is a material activity. The term *product* simplifies the wide array of outcomes designers purport to produce. The goal is not to conflate fields and outcomes, but instead to avoid cumbersome litanies like "products, services, and systems" or conjoined terms like "design outcomes" whenever discussing the outcomes of designing.

Lastly, design and user experience are not the same thing. Designers do not solely control user experience, despite some insistent design scholars. (Hassenzahl and Tractinsky 2006; Blythe et al. 2006; E. L. Law et al. 2007; Pucillo and Cascini 2013) Design, marketing, strategic planning, and engineering, to name a few, all contribute to user experience, in different and not necessarily equivalent ways. Though designers are not the sole guarantors of UX, the focus of the discussion and accounts will be on UX design. This is not to strip designers of agency, but to recognize that designers are not the only people who design or are involved in designing. As a point of distinction, the term *designers* refers to self-identified designers—those people who are trained in design (whatever that means). The claim here, borrowed from Bucciarelli (Bucciarelli 1996), is that designing is a process of negotiating courses of action. As such, designing is a distributed activity, even if individual. Likewise, user experience is a distributed focus. UX is a topic; design is an activity that, at times, addresses that topic.

What does design mean anyway?

As has been mentioned, the term *design* designates a variety of contemporary activities and domains. These various meanings and usages make defining design either a project of undue synthesis or seemingly arbitrary exclusion. While this variety stems

¹⁴Certainly fields like participatory design have more socially emancipatory aims and are harder to connect to the flow of capital.

from the ways design is contemporarily synonymous with status or desirability, or more plainly with any deliberate activity of making, the word design deserves some immediate blame. Design is both a verb and a noun, or, as John Dewey writes, design "signifies purpose and it signifies arrangement." (Dewey 2005) As such, understanding what one means by design requires some effort. Without denying the existence of other ways of defining design, design as a propositional activity forms the backbone of the subsequent accounts. This section lays out the foundation of this idea.

The terminological fray

As a verb, design commonly refers to a process of planning and coordinating various aspects of a product. As a noun, design refers to the outcomes of that process, that is, the product (as well as the field, discourse, and discipline that begets the process and outcome). This process will be elaborated further, but for the time being, *to design* refers to an activity unlike engineering, marketing, or other deliberate activities related to making products. *To design* focuses on the particular *planned character* of the product with regards to its perception, use, functioning, and viability. This definition certainly overlaps with other activities—where designing stops and engineering starts is a matter of opinion in many cases. One example of this overlap comes from design scholar Bryan Lawson, who explains that "vernacular design" occurs with a known problem. Vernacular design is, then, akin to craft. (Lawson 2005) Design scholar Herbert Simon provides another example. Simon regards design as a core capacity of every profession.¹⁵ (Simon 1996)

¹⁵Herbert Simon ("The Sciences of the Artificial", 1996) has argued that design is a core sensibility of (nearly) all professions. This general definition resembles a bounty of other processes and disciplines. While I agree with Simon that designing is something all professions do, it should not be conflated with the specific disciplines of design. The disciplines of design stand apart from other professions in that design disciplines have cultivated an aesthetic sensibility as much as (in recent years at least) a sensitivity to the lived experience of a product, service, or system. In this regard, as Kolko states about interaction designers, designers "advocate for humanity." (Kolko 2010)

Regardless of the blurry distinctions, design denotes a particular activity, namely, the illustration of plans.

In general terms, designing is commonly formulated as a planning activity that illustrates that-which-does-not-yet-exist. (Nelson and Stolterman 2003) As such, designers create means to communicate the final form of a product to various degrees, from how a product addresses a need at the conceptual level to how a product will weigh and feel in the material sense. These means come in many forms—collages, sketches, written plans, physical models, graphic diagrams, storyboards, scripted scenes, and so on. The illustrative means have various levels of fidelity to communicate different aspects of a future product. The collective A. Telier explains that:

the object of design is constituted by *things* as devices that are taken as they are, for their capacity to recall some special quality of matter, by *artifacts* that are built to allow rich interaction with the not yet existing thing, and finally by *representations* that allow us to view it. (Telier 2011)

A. Telier divide the means through which designers depict ("constitute") products into three categories. *Things* are performative depictions of products, such as workshops, card sorting, and meetings, where products are materialized in and through conversation, negotiation, and debate. *Artifacts* are spatial depictions of products, such as models and interactive mock-ups, where products are simulated. *Representations* are visual depictions of products, such as collages and 3D renderings, where products are illustrated and shown. These various means of depiction communicate specific aspects of a product in order to fully communicate to other designers, engineers, marketers, and managers what a product will be. In short, design focuses on the conception and planning of products through their depiction in various ways.

The current research regards design as a propositional activity. Design-as-proposal means that designing simultaneously produces knowledge (*inquiry*), proposes outcomes (*synthesis*), and negotiates the boundary between the knowledge and outcomes (*reflection*). Unlike more cognitive models of design, the propositional stance emphasizes the materiality of designing. In the case of design, materiality refers to the various means of illustrating a future product. Inquiry, synthesis, and reflection do not occur in the abstract—that is, with immaterial thoughts and words—but as concrete proposals through illustrative means. These depictions—things, artifacts, and representations—provide material evidence of that-which-does-not-yet-exist. When depicted, that-which-does-not-yet-exist can be made present in order to be discussed, debated, and negotiated. In this way, design synthesizes knowledge into concrete proposals that are used in critical debate. (Agre 1997) At once, designers produce concrete material (i.e. depictions) to discuss and that discussion happens in and through that materiality (i.e. depictions are compared, reformed, and iterated upon). In all of this activity, the ultimate goal of design is to reach consensus and decide upon an outcome. (Bucciarelli 1996; Schön 1983) Design constantly modulates amongst the activities of inquiry, synthesis, and reflection as illustrated proposals become material for and materialized in negotiations. Design-as-proposal, then, is not a different process of design, but a way to understand the process of design and the outcomes of that process as parts of a whole.

The following sections trace these ideas in more detail. The section is broken into two subsections. The first subsection compares several core definitions of design. These definitions are selected both due to their prominence within the domain of design and their conceptual divergence. As definitions, they make ontological claims about the

nature of designing, and introduce the idea of design-as-proposal. The comparison cuts across these definitions with a single thread about design and knowledge construction. The second subsection focuses on particular theorists working within the framework of design-as-inquiry. These explanations extend the ontological claims of what design is into how does design constitute a form of knowing (i.e. design epistemology). This subsection sets up the following sections that explores the ways designing has shifted over time due to materials, views of action, and prevailing perceptions about the role of design.

Design-as-Proposal

To define the term *design* is a rather daunting task. Design, as has been mentioned, signifies a variety of things—a discipline, a process, a field, a quality of a product, and a (slew of) profession(s), and still more. Some definitions, as Buchanan explains (Buchanan 2001a), focus on material outcomes—e.g. interaction designers produce largely interactive products and communication designers produce graphic materials; other definitions focus on the mode of production—e.g. industrial design focuses on the production of products that can be manufactured at scale; still other definitions focus on the unit of analysis—e.g. service design focuses on the unit of services, and so breaks down the world into touchpoints and information flows.

Buchanan argues that design is a rhetorical art focused on the nature of the human-made, whether those human-made interventions stem from a prehistoric human capacity for betterment or an industrial drive for optimization. Regardless of the particulars of this position, Buchanan's point instructs the present work—a definition of design trickles throughout the various signified aspects of design. Here the position taken is that design

constitutes a form of propositional activity. In this section, design-as-proposal will be traced through a variety of key definitions of design over the last several decades.

Herb Simon writes "[d]esign [...] is concerned with how things ought to be, with devising artifacts to attain goals." (Simon 1996) For Simon, design is a core competency within all professional settings, and is thus not talking about the profession of design. He explains that "[e]veryone designs who devises courses of action aimed at changing existing situations into preferred ones. [...] Design, so construed, is the core of all professional training [... distinguishing] the professions from the sciences." (Simon 1996) As much as Simon uses the term *artifacts*, he implies artifacts in two ways. First, designers orient toward final artifacts, i.e. products. Products are goals in-and-of themselves, as well as conceived of as tools to achieve other ends, i.e. preferred situations. Second, designers create artifacts, i.e. courses of action or depictions of products, to attain the goal of creating such a product. For Simon, the fundamental concern in design is the potentiality of both made things and the making of things, namely, *how things ought to be*. A major oversight is that Simon does not specify the particular means through which designers "devise artifacts to attain goals." While design proposes course of action, much is left unanswered about the work of design.

Within this competency to propose and set into motion *how things ought to be*, Simon introduces the concepts of "bounded rationality" and "satisficing" (Simon 1996). Simon claims that designing does not optimize, but instead *satisfice*, or provide satisfactory proposals to attain some end goal. Simon explains that "[b]ecause real-world optimization, with or without computers, is impossible, the real economic actor is in fact a satisficer, a person who accepts 'good enough' alternatives, not because less is preferred

to more but because there is no choice." (1996) Due to the complex nature of real-world scenarios, rational action must be bounded (1996), allowing one to act, if only partially, on what is known and knowable about present and future conditions. In this way, satisficing and bounded rationality classify the process of design as an activity of limited and focused exploration of *what-ought-to-be*, which has analytic, synthetic, and generative stages. Moreover, the concept of bounded rationality highlights that *what-ought-to-be* develops through a negotiation of the boundaries themselves.

Richard Buchanan offers a different perspective. Responding to Simon's scientized definition of design, Buchanan claims that design is, rather, a liberal art (Buchanan 2001a). He explains that design "is fundamentally concerned with the particular" (Buchanan 1995a) in order to answer to questions of humanistic interest, such as *how do we want to live?* He writes:

Design is a discipline where the conception of subject matter, method, and purpose is an integral part of the activity and of the results. [...] [T]he subject matter of design studies is not products as such, but the art of conceiving and planning products. In other words, the poetics of products—the study of products as they are—is different from the rhetoric of products—the study of how products come to be vehicles of argument and persuasion about the desirable qualities of private and public life. [...] Recognition of this is important because designers, and those who study design, often confuse the qualities of existing products with the problems of designing new products. (Buchanan 1995a)

For Buchanan, designing "shap[es] arguments about the artificial and human-made world, arguments which may be carried forward in the concrete activities of production". (Buchanan 1995a) Where Simon positions design as a systematic, if only partial, inquiry of the world under the regime of rationality, Buchanan positions design as a systematic and partial inquiry under the regime of rhetoric, that is, as arguments of the ought in *what-ought-to-be*. As such design does not produce stand-alone knowledge

(what might be called *truth* or *facts* more broadly), but produce partial knowledge, which corresponds to the particular circumstances of claims about the future conditions in question. In other words, design assembles evidence that supports and becomes embodied in outcomes from designing.

While Simon speaks of design as a professional activity—that is, inherent in all professional activity—Buchanan classifies designing by the types of problems it is concerned with, namely wicked problems. (Buchanan 1995b) Buchanan takes this term from operations research (Rittel and Webber 1973), where increased complexity resists notions of rigorous optimality. Designers address wicked problems through how they understand such problems, constructing partial and limited knowledge to act on unknowable complexity. In the original context, wicked problems resist simple solutions, that is, revealing the complex and complicated nature of a situation. Unlike (though strikingly similar to) Simon's concept of satisficing, the partial and limited ways of knowing within design is not a feature of time or cost¹⁶; instead, the partial and limited knowledge produced by designing is a feature of the problems themselves when seen as design problems.

Focusing on product semantics (what Buchanan would call the poetics of a product), Klaus Krippendorff writes, "the forms designers create [...] result from nothing other than professional, as opposed to ordinary, sense-making." (1989) While Krippendorff focuses on the final meaning of a product, his statement offers clarification in light of the claims of Simon and Buchanan. While focused on design as knowing-through-making (*technē*) (Wang 2013), Simon and Buchanan assume a coupling between

¹⁶Recall the way Simon phrases the need for satisficing—"the real economic actor is in fact a satisficer." (1996) Simon is claiming that satisficing, and so designing, is the professional competency of deciding in light of partial and limited knowledge not because it is impossible to do so, but because it is too costly to do so.

what comes to be known through design and the resultant product of designing. Krippendorff argues that form-giving is more than using some knowledge set to make something embodied; it is constructing a conduit of this knowledge, that is, making meaningfulness. As such, designing is not a formal practice with meaningful consequences, but a sense-making practice with formal consequences. While Krippendorff focuses on the final product, his perspective also offers insight into the work of designers. The intermediate depictions—sketches, models, and workshops, to name a few—also constitute a type of professional sense-making in how these depictions represent potential outcomes. These depictions, in whatever form, are negotiated and iterated upon, thus suggesting that sense-making happens in and through the process of depicting.

Krippendorff offers a final point that will be more salient in the context of user experience design. The implication of Krippendorff's suggestion is that the products designers craft are meanings themselves. While Krippendorff overextends the agency of the designer to craft meaning—equating intention and result—his point offers another position on the goal of designing. Even in light of the imperfect translation of intention and result, Krippendorff argues that the literal product of design is nothing more than a pathway for the true result of design: the meaningfulness such products create.

More recently, Harold Nelson and Erik Stolterman advance an unmoored definition of design, eschewing scholars who have placed design between or within other fields (e.g. Simon's science of design and Buchanan's design as a liberal art). This "third way" (Nelson and Stolterman 2003) explores design as a unique epistemological position. They write, "Design is the ability to imagine *that-which-does-not-yet-exist*, to make it

appear in concrete form as a new, purposeful addition to the real world." (2003) Here again we see that design is a process and discipline to plan and execute a course of action in a deliberate and considered way. Designers work to form proposals through depictions of products that stem from inquiry, synthesis, and reflection. Nelson and Stolterman go on:

Design is about evoking, or creating, the ideal in the real. But design has to be grounded in what is already real, as well as what is actually true. Since the real is overwhelmingly complex and rich, we are unable to grasp the totality of that complexity and richness solely by using the systems of inquiry created to reveal what is true and factual. The reductive approaches made available to us through analytic science are not meant to handle inquiry from a holistic sense, but the real is a whole and therefore we need another approach. Any new design is something that is both real and whole. As such, that new design is, by definition, too complex and rich to predict with accuracy how any real design will serve the world and, in turn, how it will change it or be changed by it. (Nelson and Stolterman 2003)

Nelson and Stolterman, like Simon, Buchanan, and Krippendorff, claim that designing depends on an array of intertwined and partial knowledges of past, present, and future conditions. Unlike science—which is concerned with truth and facts—and unlike art—which is fundamentally concerned with the ideal (even in circumstances of embracing abject aesthetics)—design strives to neither reduce possibilities to some common unit of analysis, nor collect possibilities under a single banner. Instead, as a process and discipline, design bridges the overwhelming holism of these conditions by finding intermediate means to act and build understanding. Höök and Löwgren refer to knowledge outcomes of design (research) as "strong concepts" (Höök and Löwgren 2012), which depend on paradoxical (Dorst 2006) bridges across theories and disciplines within particular settings.

Across these various definitions of design are several key similarities. First, inquiry through/for design aims to act upon the knowledge. Inquiry serves the aims of developing products, writ large. Inquiry and knowledge are not ends in-and-of themselves within the activities of design. While inquiry is vital to designing, knowledge is not the desired outcome of such inquiry—a product is. As such, knowledge is always synthesized. Second, design is optimistic with regards to the role of products to operationalize knowledge. Simon, Buchanan, Nelson and Stolterman, and Krippendorff (amongst so many others) all position designing as capable of remedying, alleviating, or otherwise bettering current conditions. While Simon and Buchanan use terms such as *problem* and *solution* to indicate the way design betters the world—that is, transforming problems into solutions through intervention—Krippendorff and Nelson and Stolterman discuss betterment in terms of meaningfulness or purposefulness, respectively. A more abstract conceptualization of betterment within design posits that designers internally conceptualize of designing as able to contribute something that is useful, usable, and desirable (Kolko 2010a). Designing aims to produce something worthwhile in the context of production and that worth is a matter of framing. Third, design synthesizes partial and limited knowledge of particular circumstances. Partiality does not mean that designing are unsystematic, haphazard, or sloppy. Instead, designing rigorously constructs knowledge of the particular rather than the general conditions of the world. Rather than aiming to abstract knowledge, design concretizes it in proposal for products that are manifest as product depictions.

These three points summarize and define design-as-proposal. The central activities of this idea are inquiry, synthesis, and reflection, or building knowledge of the

particular, operationalizing knowledge to meet ends, and assessing and negotiating the particular knowledge and proposed outcome. What is missing is understanding the activity of proposing. Such a perspective, as the next section will show, adds a final point that is buried within the previous definitions—designing is how designers propose new ideas, namely, through the construction of depictions of products.

Designing-as-Proposing, or, Design Work

In *Designing Engineers*, Louis Bucciarelli claims that most descriptions of design tend to focus on ways of how designers think or the design process, but not on designing itself. He argues that the field of design studies confuses the proposed design process and the activity of designing. The former, as much as it is true, is generic and ignores the lived realities of design work. He explains that "[c]ontemporary design is, in most instances, a complex affair in which participants with different responsibilities and interests—that is, working within different object worlds—must bring their stories into coherence." (Bucciarelli 1996) Bucciarelli introduces the term *object worlds* to describe the particular modes of thinking and acting, as much as surrounding objects, value structures, and temporal rhythms, that compose the world of the designer. The process of bringing these various specialties into agreement as a planned artifact is what he calls designing. Bucciarelli writes:

[T]he process of designing is a process of achieving consensus among participants with different "interests" in the design, and that those different interests are not reconcilable in object-world terms. There is not overriding perspective, method, science, or technique that can control or manage the design process in object-world terms. The process is necessarily social and requires the participants to negotiate their differences and construct meaning through direct, and preferably face-to-face, exchange. Designing and design decisions depend, then, upon the values and interests of participants. This is not to deny the importance of scientific and technical constraints and specifications, but these are not determinate. Participants

must move beyond the secure confines of object worlds and engage one another on more common and less ordered ground for design to proceed. In this, participants' interests shape their proposal, explanations, and understandings. (Bucciarelli 1996)

For Bucciarelli, design cannot be understood solely by way of skills, outcomes, materials, or sequencing—this confuses the discipline with the practice. While these disciplinary knowledges contribute to design, so too do the negotiations that shape and enlist the various materialities of proposed outcomes. This perspective rings of Simon's claim that design is a core competency of professions from product development to management. (Simon 1996) For the purposes here, Bucciarelli's argument can be understood in that all processes of designing—inquiring, synthesizing, and reflecting, or fully, *proposing*—are social processes. Based on how one approaches the various constraints and demands of a project through the lens of an object world, inquiry, synthesis, and reflection will differ. For Bucciarelli, these activities alone do not fully constitute designing; designing occurs only when those activities are brought in contact with other proposals. Bucciarelli argues that even in instances of doing this alone, one can design if one allows for other stances to have bearing on proposals. As such, when agreement is reached, the design task is over as design assumes some form of negotiation.

Donald Schön, a contemporary of Bucciarelli, posits a similar notion. For Schön, design is "a conversation with the materials of a situation." (Schön 1983) In his attempt to more broadly theorize the co-temporality of reflection and action (what he terms *reflection-in-action*), Schön explains,

A designer makes things. Sometimes he makes final product; more often, he makes a representation—a plan, program, or image—of an artifact to be constructed by others. He works in particular situations, uses particular materials, and employs a distinctive medium and language. [...] He shapes the situation, in accordance with his initial appreciation of it, the situation

"talks back," and he responds to the situation's back-talk. In a good process of design, this conversation with the situation is reflective. In answer to the situation's back-talk, the designer reflects-in-action, of the model of the phenomena, which have been implicit in his moves. (1983)

Schön states that design begins from an appreciation, that is, a perspective, on the circumstances that an individual confronts as the constraints of design. Designing entails proposing "what ifs" and eventually making decisions with "binding implications."

(Schön 1983) As an individual designs, the materials of the situation exert force against these decisions and their implications, leading to redirection and subsequent decision-making.

Notably, Schön does not discuss the particulars of what we means by "the materials of a situation." His main example entails architectural sketching in which a teacher and student work together. A simple reading of this example reveals that the materials include the sketch, the represented space, and the known and inferred constraints and specifications. The literal depiction of "the material situation" is accompanied by additional tacit constraints. A more complex reading inscribes the trained architect and student of architecture into the materiality of the designing. As the architect sketches and suggests ideas, continually reflecting on their implications, he is demonstrating for his student a type of argumentation. As the student follows along, she is led through the architect's reasoning and shown the ways the circumstances shift and present new issues to be addressed. As designing occurs, the intersubjective spaces, as much as the other relational spaces between actors and actants, changes. Schön's ambiguity opens up space to consider a common ground with Bucciarelli's notion of design being a social process. Even more, a broader notion of the social, like that found

within actor-network theory and notably discussed by Bruno Latour (Latour 1996; Latour 2005a; Latour 2005b), further links Bucciarelli and Schön.

Design Things traces the myriad ways the design process enlists humans and nonhumans through the creation of design artifacts (prototypes, sketches, wireframes, models, etc.). Where objects (that is, products, artifacts, and representations) are typically understood as being for users, the authors consider the ways objects themselves constitute an ontology that is "a map of its constituents" (Telier 2011). Designers propose ways to bind together disparate constituents through the creation of objects. These objects serve the purpose of mediating the relationship. The authors invoke a conceptual position that empirical philosopher and sociologist Bruno Latour advocates (Latour 2005b; Latour 2005a) through their use of the term *thing*. Like Krippendorff's notion of sense-making, designers propose relations amongst people, activities, objects, and skills, or what Latour calls *things*. For the collective A. Telier and Latour, objects and things are opposing concepts. Where objects are withdrawn and isolated (Harman 2009), things exist only in their relations.

The concept of design things implies that designing requires a continual flux of what is being made and how it stands to address needs, wants, and desires. As a designer works, she enlists a wide array of humans and nonhumans that compose both the setting and trajectory of design. This composition cannot be reduced to the outcome itself. Instead, the composed thing is always modulated to attend to the particular way of understanding and arguing for an outcome. Where Krippendorff argues designers formalize meaning—ostensibly nesting it within a product as a set of signifiers—A. Telier argues that the *form* created by designers is not the product, service, or system, but

instead the relations that the product, service, or system demand, preclude, or otherwise render extant. Design inquiry is structured around the creation of many mediating artifacts, each of which re-present the product and refine, negotiate, and argue for some to-be-completed product. Following this logic, the final product is, then, just another mediating artifact, manifesting a particular set of constituents we come to call the end-users. The authors shift focus toward a continual process of understanding what is and is not brought together. Borrowing from Höök and Löwgren, we might call this type of knowledge "intermediate knowledge" (Höök and Löwgren 2012), or knowledge which draws together theoretical abstractions and ultimate particulars. Hence, designers make mediating artifacts in order to balance the various desires of the product stakeholders.

More recently, Elizabeth Goodman expands this notion of design as a social process to include performance for clients. Goodman argues that while designers (her focus is specifically on interaction designers) work through the circumstances of a project to arrive at a proposal, designers also engage in a performative argumentation for clients. These performances are often self-effacing in how they argue, rendering major insights that simply "jump out" from the method itself or leading clients through believable interactions of yet-to-be-made interactive products. (E. S. Goodman 2013) In non-pejorative way, these performances are coercive and lubricate agreement amongst parties. Designing finds consensus amongst stakeholders and materials, and at times does so through performative knowledge construction. More than just a type of immediate negotiation, designing is a continual process of alignment. This alignment occurs through the materiality of design—namely, the representations that structure designing. Goodman writes,

Interaction design does not just depend on making "everything" — needs, goals, behaviors, and features visible in a shared field. It also depends on negotiation between designers and clients about what the "everything" "needs to be." The negotiations may result in decisions by the clients, in mutual agreements made explicitly between clients and designers, or in collaborative alignments enacted by placing tokens and linking them together. So it is not surprising that designers put so much effort into showing — that is, displaying objects so that they can be appropriately seen, and so that the meeting participants can witness each other move them. These decisions and agreements, made through the politics of tokenizing, grouping, accretion, and removal of tokens, distribute competencies between designers, client-businesses, users, and systems. They put the classifications embodied in the Post-it note boxes to work. In effect, in order to get the agreements necessary to make them "do work," the classifications generated by interaction designers are not only seen, but shown in a forum of alignment. (E. S. Goodman 2013)

More than just proposing products, designers employ a wealth of skills that fall outside of the purview of what is typically discussed as the design process. Similar to the concept of the design thing, performance highlights that designing entails a great deal of logistics—representational changes; getting approval from stakeholders, team members, and clients; communicating and presenting reasoning. Professional designers unfold proposals temporally.

More importantly for the present research, Goodman explains that these performances are necessary portions of designing since design happens within a much broader network of work and professions. Jon Kolko, without using the term *performance*, explains these performative acts through the notion of externalization during the synthesis phase of designing. He writes, "Once externalized, the ideas become 'real'—they become something that can be discussed, defined, embraced, or rejected by any number of people, and the ideas become part of a larger process of synthesis." (Kolko 2010a) Like Bucciarelli and Schön, Goodman and Kolko conceptualize design as a social process of negotiating proposals. For Goodman and Kolko, however, design is a process

of performing proposal depictions, in which performance means both unpacking the tacit knowledge of depictions (i.e. making them realistic) and confronting different proposals within a group of constituents (e.g. other designers, engineers, clients, etc.).

To summarize, designing relies on limited, partial, and particular inquiry that is synthesized into particular depicted forms, and considered in terms of other such depictions. Designing requires various proposals to be negotiated and reconciled. This reflective activity calls into question the perceived problem (i.e. the knowledge produced) and the particular opportunity (i.e. the synthesis). In other words, designing, while frequently spoken of in terms of solving problems, acting on opportunities, or addressing contemporary conditions, constitutes a form of *problem-setting*. Designing proposes what is at stake rather than simply accepting conditions as *a priori*.

As should be evident now, designing interleaves knowing and doing, and constructs the product as well as the surrounding context. Knowing and acting are not temporally distinct, but instead differently emphasized at particular times. While individuals may be given roles of researcher or designer or engineer, it is their interaction that constitutes designing rather than any particular activity amongst them. Design is:

"a crossing and a diffusion point of the most diverse fields, that is, a sort of frontier discipline, dynamic and adventuresome, in which the small and the grand strategies of intervention in and transformation of everyday life [are] incessantly verified, assimilated or rendered superfluous." (Vitta 1989)

As such, the activity of design (as much as the fields and disciplines) is distributed throughout the lifecycle of a product's development and throughout the team. At different moments within this lifecycle, designing looks different, negotiating different sets of conditions, needs, outcomes, and resources, all of which is done through different types

of depictions, from 3D renderings to circuit diagrams to powerpoint presentations. In short, designing-as-proposing occurs across the activities of a group (Bucciarelli 1996) and through the available resources. (Schön 1983; Telier 2011; E. S. Goodman 2013)

Developing Experiences

Design-as-proposal provides a conceptual frame for the subsequent empirical accounts. While discussing design thinking, Nigel Cross offers an axiomatic summary that applies to the previous discussion. He writes:

Despite the prescriptions of many design theorists, designers do not normally tackle these problems by first attempting to define them rigorously or analytically. [...]

Designers explore problem-and-solution together, using "languages" of drawing and modelling [sic]. [...]

Designers use alternative solution conjectures as the means of developing their understanding of the problem. [...]

Designers impose additional constraints that narrow the solution space and help to generate concepts. [...]

Designers change goals and adjust constraints during the process of designing. (Cross 1992)

As these assert, designing exceeds the linear and prescriptive accounts of the design process. Designing, while identifiable as an activity, happens in a messy and fluid manner, shifting amongst perceived conditions, future conditions, and the rigors of the project itself. Designing entails cyclical understanding and negotiating of and with materials, depictions, and others. The focal object of this process is *that-which-does-not-yet-exist*. (Nelson and Stolterman 2003) As scholars from Buchanan to Bucciarelli indicate, *that-which-does-not-yet-exist* changes shape during design, and so designing is a definitional activity of determining what *that-which-does-not-yet-exist* will be. Giving

shape to *that-which-does-not-yet-exist* occurs through an array of depictions, some of which are domain specific (Bucciarelli 1996), that serve as negotiable proposals for the form, function, purpose, and character of a product.

While Cross' notion of design thinking relates almost directly to the way design-as-proposal has been described, one main difference makes this concept unattractive—namely, the emphasis on *thinking*. The notion of design thinking that Cross (Cross 1982; Cross 1992) and Buchanan (Buchanan 1995b; Buchanan 1995a) advance holds a great deal of insight without asserting that design is a solely cognitive activity. In the previous excerpt, for example, Cross emphasizes that designing materializes proposals in the form of representations and these representations are explorations, or, as Buchanan puts, depictions do not just "clothe design thinking; [they are] design thinking in its most immediate manifestation." (Buchanan 1995a) However, design thinking emphasizes the designer as the agent of design, and so puts undue emphasis on the designer's agency in bringing about the final proposal. Even more, in recent years as design thinking has seen new attention in management and business texts (Brown 2009; Lockwood 2009), the designer-as-agent has become the focus of designing, ostensibly ignoring the way ambient environments contribute to design.

Regardless of terminology, Cross emphasizes a key feature of the activity of design: design is not an ordered or orderly process of materializing a product, but rather of conceptualizing a product. The form, function, purpose, and character of a product are defined during design as well as the conditions (i.e. the relevant circumstances) that are being addressed by a product. As much as designing is goal directed, designing redirects goals as well. Designing design demands, as Bucciarelli argues, negotiation. The agent of

design, then, is constructed in the activity rather than prior to it. This critique of design thinking will be revisited in Chapter 6, which focuses on the relation between institutional mechanisms and professional practices.

In the context of this research, *that-which-does-not-yet-exist* is a/the user experience. Within the particular scope of the case study, a/the user experience is designed as an overarching character of what a device supposedly does (Chapter 5), how designing supposedly occurs within product development (Chapter 6), and why a software suite is supposedly important (Chapter 7). I say *supposedly* because, within this case study, the interest is design work—what work counts as design and what design counts as work—and so the products themselves are representations of the *supposed* character of use. While other design activities occurred contemporaneously, the focus will be on the discussions around user experience in order to explore the integrative negotiations that make up designing. To set up these observations, the current section attends to the term *user experience* and what user experience means as a product itself. More than a commonsensical explanation, the chapter does not offer a new definition, but instead provide a landscape of what user experience is.

The next sections ground user experience within a history design. These sections progressively move outward from the user experience as a product to user experience as a culture of production to user experience as an organizational initiative. These different scales understand user experience differently—as a product, as an approach, and as a strategy, respectively.

Function follows experience

The phrase *form follows function*, coined as part of Modernist design traditions during the mid-20th century, is a rather common trope within design. *Form follows function* is a now-colloquial mantra that means the form of an object, broadly construed, should be either indicative of what the object does or come second to the definition of the object's use. Dieter Rams recasts this idea in his seminal (and fittingly short) "Omit the Unimportant," where Rams explains his approach to minimizing extraneous elements of design "in such a way that [a product's] function and attributes are directly understood." (Rams 1989) A more abstract reading *form follows function* is in terms of the foundations of designing it invokes. Where form defines space and concrete entities, function defines time and dynamic (and embodied) relations. To engage in design is to engage with embodied use (i.e. function in form) and the body of use (i.e. the user). As such, *form follows function* can be understood as an (re)ordering of time and space within design, where time¹⁷ becomes the primary material of design. Elizabeth Shove argues this point—namely, that design, in fact, makes routines, activities, and rhythms of use—through her study of the daily lives of users. (Shove 2007)

The primacy of time has a wide set of implications for what designers make; user experience is one such outcome of this configuration of time and space. The rise of disciplines such as interaction design in the last decades of the 20th century and service

¹⁷Temporality here might be better understood as duration (Bergson 1965) or being (*Dasein*). (Heidegger 2003; Moran 2000) The former concept focuses on the way moments come to constitute a form, collected in an order (i.e. time), to be what we identify as living. The latter concept focuses on being as being-in-the-world. Both Bergson and Heidegger, though in wildly different ways, struggle with how individuated bodies come to live, and so are extended into time. For Bergson, the core explanatory mechanism is the moment-by-moment existent entity that is both persistent and changing. Deleuze (1994) picks up on this in his treatise titled "Difference and Repetition." For Heidegger, the core explanatory mechanism is prehension, or pre-cognized understanding of doing. In this state, being shifts from a question of ontology to one of phenomenology—how is the world apparent for living? Heidegger offers the concept of readiness (ready-at-hand versus ready-to-hand) to claim that being-in-the-world precedes rather than follows gross understanding of the world. In other words, the reflective stance found in ontology is a second order of being.

design in the early 21st bare such evidence as well. In these disciplines, time, more so than space, defines the product of design. Interactions are designed by constructing moments; services are designed by constructing "touchpoints" (Kimbell 2009). Both materialities are understood only through activity. While various narratives explain the rise of user experience, the narrative presented here focuses on the language of user experience as both a topic for and product of design that deals with time as a material.

The origin story of interaction design provides an example of the reconfiguration of time and space. In the introduction to *Designing Interactions*, Bill Moggridge recounts the first laptop computer, which he helped design:

I soon forgot all about the physical part of the design and found myself sucked down into the virtual world on the other side of the screen. All the work that I had done to make the object elegant to look at and to feel was forgotten, and I found myself immersed for hours at a time in the interactions that were dictated by the design of the software and electronic hardware. [...] As I gradually mastered my personal computer, almost all of the subjective qualities that mattered most to me were in the interactions with the software, but not with the physical design. (Moggridge 2007)

Moggridge's explains his shifting interest as both self-evident and surprising. The computer, he realized, had less to do with how it looks than what it does. As a result, the software and virtual workspace became primary, but, more importantly, *separate* from the physical design. Moggridge uses the story to illustrate an emerging role for designers:

At that point I realized that I had to learn a new sort of design, where I could apply as much skill and knowledge to designing satisfying and enjoyable experiences in the realm of software and electronic behaviors as I had with physical objects. (Moggridge 2007)

Moggridge makes a subtle yet substantial claim here. While the virtual world and software are arresting, Moggridge does not claim that there is an emerging role for designers to make software or virtual worlds. Instead, he claims that the role for designers

is to design *experiences* in software *as designers do with physical products*. As such, Moggridge claims that the products designers craft—physical, virtual, or otherwise—are but a conduit for satisfying and enjoyable experiences. Even more, the design of experiences is not limited to the virtual or computerized space, but a generalizable stance toward the relationship of product development and the contribution of design. This stance toward the outcome of design has a longer history than Moggridge implies.

In an attempt to understand the responsibility of companies and the task of designers in an age of "an immense number of comparable products" (Margolin 1996), Abraham Moles hypothesizes:

[W]hat has been the traditional function of designing objects such as office lamps, potato grinders, typewriters, or furniture, and the underlying basis of design education is no longer important. Rather, we need to consider the design of the total environment that is attached to the successive and perceptible "shells" enclosing individuals at every moment and determining their relation to the world. [...] **[D]esigners are no longer creators of objects but of environments.** The design task is to reconceptualize the various external shells that surround human beings in order that a means of deriving the greatest possible satisfaction from their position in the world and the possibility for attaining a specific quality of life is not made more and more remote. (A. Moles 1985; emphasis added)

Moles identifies that products have an ambient quality as they are constitutive of an environment. Moles, a sociologist, remarks that such a change in focus "suggests a transformation from a society that supplies goods to one that supplies services centered on goods." This rings of the Heideggerian notion of the making of technological objects (*technē*) as an unveiling of resources in the world. (Heidegger 2003) For example, a stapler embodies stapling. According to Moles, a person who purchases a new stapler is purchasing the function of stapling—or, more abstractly, the ability to bind paper—rather than the material stapler itself.

Moles uses this stance to advance what he calls "the comprehensive guarantee," (A. Moles 1985) or the responsibility of a company (and, by transitivity, a designer) to ensure the cost of a product matches its functioning over time. Moles argues that one must calculate all aspects of cost with regards to a product—from the time it takes to browse at a store to the cost of integrating something into normal activity to the cost of repair or disposal. Moles argues that if this total cost does not exceed the expected longevity a product, then the cost of replacing it—for instance, buying a new stapler—is both understood and justified. This stance toward designing obviously implicates designers within commoditized or rapidly changing markets for planning obsolescence. More important to the present discussion is that Moles abstracts all design activities to the production of environments. Moles explains that designers compose "micropsychological" aspects of the environment, and must understand the role a product "is to play in the life of the user." (A. Moles 1985) As such, lived experience is the site of intervention for designers.¹⁸

In shifting attention away from products to the contextual environments of product, Moles points to what Buchanan calls the "doctrine of placements." (Buchanan 1995b) As Buchanan explains, design categories—the concrete skills of execution and domains of products—orient and contextualize thinking when performed well. What he calls *design placements* are the flexible orientations of domains like industrial design or communication design. Buchanan argues that design activities are not focused particular types of outcomes—say, computers or signage, respectively—but instead on issues related to fundamental questions of a domain—say, how might consumer products or

¹⁸Moles cautions about solely entrusting designers: "Such conceptions, even favored by the consumer market, would oblige producers to master all branches and aspects of the life of products in society, a task for which they are not actually prepared, even if, within a general conception of economy, 'there is money in it.'" (Moles 1985)

communication materials address the conditions under scrutiny? The doctrine of placements parallels Moles' argument all design activities as generative inquiry into the environmental and circumstantial conditions of products. While these conditions are not the same as experience, Buchanan certainly provides grounding for claims (such as Moggridge's and Moles') that assert the primacy of (user) experience as a product.

Taking up Moles, Victor Margolin hypothesizes about the future directions of design. He writes, "a user is actually purchasing an environment that promises a satisfying relationship to the product [and] the total organization of such environments [constitutes] the new threshold for design." (Margolin 1996) While we can assume the development of new curricula and the advent of new methods might prepare a designer, "total organization" is a deeply troubling phrase. Such a totalizing endowment, as Johan Redström points out, leaves only one logical end: designing users themselves. (Redström 2006) As "the new threshold for design," Margolin attributes designers with a totalitarian agency over the user, which is at once naive and terrifying. Redström's indictment withstanding, an environmental stance toward product development and design begets conceptualizations of design as totalizing and holistic, and fundamentally concerned with the orchestration of the character and experience of that environment.¹⁹

A contemporary interpretation of these same ideas comes from Jon Kolko in *Thoughts on Interaction Design*. In the practitioner focused text, Kolko explains the product of Starbucks as follows:

Recall the last time you enjoyed a cup of coffee at Starbucks. The store probably welcomed you with soft, subdued lighting; the warm and rich colors on the wall set a backdrop for the array of comfortable, oversized chairs and couches that surround the perimeter of the store. Before the

¹⁹The concept of total design (Pugh 1991) is introduced in the subsequent section to talk about design initiatives.

barista welcomed you with a smile, the music playing complemented the physical with soft and often jazz-inspired rhythms. All of this, however, is trivialized by the rich delightful scents of freshly brewed coffee and rich pastries. [...] **Starbucks Corporation is not selling coffee, as much as they are selling an experience. When considering the actual product that is being consumed, the coffee begins to play a rather inconsequential role.** (Kolko 2010a; emphasis added)

Kolko's point resembles that of Moles, now framed within the language of interaction design.²⁰ Moving from the terms like *environments* and *shells*, Kolko uses the contemporary equivalent—the term *experience*—to highlight a holistic, lived, and totalizing stance toward products. Behind Kolko's seeming love for the Starbucks experience, we might question to what extent this description deals with the intention of the experience as opposed to its actual manifestation, as well as with the cultivation of a particular culturally situated notion of the coffee shop that is not universal (despite the ever-present glowing green sign) and highly mediated. While "jazz-inspired rhythms" might be pleasant to some (pleasantness is their intention), other patrons might find these to be overwrought covers of classic jazz standards. Additionally, the image of a smiling barista denies that grumpy baristas are forced to smile to maintain the cohesiveness of the brand. Redström's point takes on a new valance from this reading: the design of people may not be the users, but the workers inscribed into the product itself. This idea will be revisited throughout the case study.

User experience, a product and an approach

Good design, on the other hand, results from interdisciplinary, human-centered product development. This approach addresses the whole product, fulfilling the

²⁰"Designers at Starbucks, Forth & Towne, and Apple have explored the nature of experience and the role it plays in the creation of sales—they have focused their efforts on the shopping experience. The designed product is ambiguous, and it becomes difficult to understand the relationship between physical and formal qualities of a product, and the experience in which it is bought, used, or discarded. In fact, this distinction may be irrelevant. Interaction Designers do not consider a designed artifact as distinct from the **experience** in which it is found." (Kolko 2010a; emphasis added)

needs of the user and the business that manufactures the product. It takes into account the total user experience. (Donald Norman 2003)



The term *user experience*, when it is attributed (Väänänen-Vainio-Mattila, Roto, and Hassenzahl 2008; Gegner, Runonen, and Keinonen 2011; Gross and Bongartz 2012), is attributed to an industry case study presented at the seminal human-computer interaction conference (SIGCHI) in 1995 (Don Norman, Miller, and Henderson 1995). In the one-page presentation abstract, the authors write, "In this organizational overview, we cover some of the critical aspects of human interface research and application at Apple or, as we prefer to call it, the 'User Experience.'" This early mention uses the term *user experience* as a shorthand for an approach and domain of research, design, and development. The article cites the "complex issue [of] determining the location and function of the on-off switch" as exemplary of the value of user experience. Without more explanation (and presumably the details were in the presentation itself), the article is rather cryptic. Are the authors saying User Experience is just another name human interface research and application, or is User Experience a *new* approach to what has been called human interface research and application? The authors use of the definite article ("the") further confuses matters: is *the* User Experience just *the* critical aspects of such research? Even more hidden are the organizational implications: is User Experience a department (or departments), the activities of such department(s), or departmental outcomes?

The appearance of the words user and experience side-by-side predates Norman et al., that is, predates the term *user experience* as such. In these even early mentions, user experience is contextually defined as, what might be called, *actual use*: habituated,

continued, or skilled encounters with an artifact or system. The precise meaning of actual use varies from the skilled interaction of someone well-versed in a technology (Thomas 1977; D. Smith et al. 1982) to generic or first-time use (Ehrman 1970; D. D. Chamberlin et al. 1981; Hornsby and Leung 1985). In these citations, the artifacts are all computational²¹—such as databases (Berg 1975; Taylor and Frank 1976) and informational interfaces (Joyce and Oliver 1976). Actual use remains largely indistinguishable in these texts from inscribed (or intended) use (Latour 1992). The qualitative or lived sense of use (as Norman et al. seem to allude to with "human interface") is simply absent.

Most interestingly, these early articles invoke the words *user experience* and the concept of *actual use* for closure (Pinch and Bijker 1987)—to settle lingering issues, bugs, or unforeseen outcomes. For example, Hornsby and Leung write about the wonders of a new programming language stating that "[a]lthough the language is not relational complete, actual user experience indicate [sic] that it is much more powerful than" its predecessor (1985). As such, user experience exists outside of technical arguments for, say, relational completeness, and imposes a new view on technical and computational artifacts. In doing so, user experience exerts authority over purely technical argumentation. Where issues of relational completeness may be important to the domain of programming language development, the authors imply that relational completeness does not hold sole (or maybe any) providence over the usefulness, usability, or desirability of such a language. Instead, *actual use* is an alternate evaluation to situate technical artifacts, transforming them into *sociotechnical* things.

²¹The search for these earlier documents was done in the ACM database, so this is not surprising.

In another early article, the author writes, "[u]ser experience with those routines showed that there is one case where the algorithm fails." (Ehrman 1970) In this use, user experience implies actual use over time. The implication is that without actual use over time the circumstances of failure may never have been discovered. In this, as much as the former, user experience acts upon and outside of the technical assumptions of a product or system, that is, the formal definitions of something working. Actual use renders an artifact complete (i.e. something works) upon use. As such, actual use reveals the social accomplishment of a product's value.

Contemporary user experience literature justifies the role of user experience in surprisingly similar terms, though UX shifts away from an analytic category to a generative one. The hedonic/pragmatic model of user experience (Hassenzahl 2007), for example, divides user experience into do-goals (pragmatics) and be-goals (hedonics). Pragmatics are "the product's perceived ability to support the achievement of 'do-goals,'" i.e. the rote purpose of a product (e.g. being able to make a phone call with a phone). Hedonics are "the product's perceived ability to support the achievement of 'be-goals,'" i.e. the cultural and personal purposes of a product (e.g. a phone making one closer to distant relatives). User experience is, then, "the complex interplay of situation, individual and product over time." (Hassenzahl 2007) Hassenzahl explains that attending to this interplay of context, person, and use upfront leads to successful products. In other words, a successful product is a product that is built with this interplay in mind.

Pucillo and Cascini (2013) take up Hassenzahl's conceptual model and proposes a new framework for designers. The authors reinterpret Hassenzahl's binary hedonic/pragmatic model and add a third type of goal: motor-goals, or goals associated

with rudimentary manipulation of a product. Motor-goals supplement the functional do-goals and the aspirational be-goals. The paper posits that all of these goals stem from different types of affordances inscribed into a product. Motor-goals stems from ergonomic affordances (e.g. contoured handles and the travel of buttons) and do-goal from task-completing affordances (e.g. the relation of the handle a door latch and the alphanumeric arrangement of buttons on a phone). Be-goals, the authors argue, come from "experience affordances", or inscribed characteristics of products that oriented users toward higher level social, cultural, or personal motivations. The authors explain,

UX Design deals with the intertwining relationship between the objective and subjective, the internal and external aspects composing human-product interactions: an issue to be solved is then that of framing from a unique perspective the product, the user and the context. For this purpose, designers need a tool capable of seizing both the user and world around her: a suitable one is still modelling [sic] affordances. (Pucillo and Cascini 2013)

Like the concept of affordances advanced most prominently by Donald Norman (Donald Norman 1998), designers inscribe experience through aspirational affordances into products. While offering an analytical model for understanding imbued meaning, the authors do not address the particulars of what it means to actually do this inscription.

Like the authors already mentioned, others justify the underspecification of how to *do* user experience design and development on the very grounds of its definition. In a survey of UX practitioners, Law et al. (E. L.-C. Law et al. 2009) compare five definitions of user experience. These definitions range from UX as a totalizing impact of a company to UX as the affective state during use. Regardless of the specific modulation of various design and development responsibilities (that is, the scope and scale of activities, and so who and what is involved in UX), all the definitions depend on assumptions of partial,

indeterminate, and project-specific measures. Law, Roto, and Vermeeren attribute the poor definition of UX to its association with "fuzzy and dynamic concepts." (E. Law, Roto, and Vermeeren 2008) Hassenzahl and Tractinsky justify the poor definition of UX as "UX is about technology that fulfils [sic] more than just instrumental needs in a way that acknowledges its use as a subjective, situated, complex and dynamic encounter." (Hassenzahl and Tractinsky 2006) Bargas-Avila and Hornbæk refer to this entangled state as a concern with holism within user experience work. (Bargas-Avila and Hornbæk 2011) Others use holism (E. L.-C. Law et al. 2007; Forlizzi and Battarbee 2004) or harmony (Saffer 2007) as a justification of why specification is so hard (or even impossible).

Norman argues that user experience—what he refers to as the *total user experience*, a term that resonates in the next section when discussing *total design*—requires the harmony of diverse teams and interests. While user experience is not design, Norman explains user experience as a project of negotiating and therefore can be designed. He writes,

They develop a great design, but by the time the product is shipped it has been completely distorted. "Can you help us stop companies from ruining the design?" designers ask. This question points out the fundamental flaw in understanding the role of design. Design cannot be separated from the other considerations of a product. The person who 'ruined' the design probably was trying to improve some other dimension of the product. The design must have been unsatisfactory in some way. This happens when the industrial design team's work is completely without consideration of all the relevant variables and then the team is frozen out of the final decision process. [...] All design is a series of tradeoffs. (Donald Norman 2003)

Four points summarize the various positions of scholars writing about user experience. First, the term user experience refers to wide field of interest within the development of products, services, or systems that focuses on use and integration of designed things into everyday life. As such, user experience (as a field of interest) claims

that successful products are those integrated into life—that is, used and routinized—and created with the environment of use in mind. User experience, then, occupies a space between language of market viability (i.e. economic value), of personal attachment (i.e. aspirational value), and of product innovation (i.e. technological value). In this intersection, user experience practitioners and advocates switch amongst various valuations to justify the importance of user experience.

Second, user experience is a flexible and malleable set of activities due to its focus on situatedness and the environment a product creates. As such, user experience has a diversity of methods that span disciplines and domains. These diverse methods depend on an exploration of actual use. In the case of new products (the case where user experience tends to be found within computational technology companies), this actual use is forward looking. Less well articulated but certainly present is that the specificity of user experience methods extend into the organizational understanding of the role of user experience within product development. In other words, the power of user experience to aid product development manifests in the organizational recognition of methods and goals as powerful.

Third, while user experience can be a focus of designers, the execution of user experience development is a rather large project. User experience development aligns activities outside of design under a common regime of articulating and utilizing lived realities of (potential) users. This is not to say user experience is not designed, but that the design of user experience is the ability of an organization of various disciplines to negotiate and decide on what user experience means, the role it plays in the product development cycle, and the specific visions of what the intended user experience is. In

simpler terms, user experience design is not the process of user experience designers, but of teams engaged in negotiating the various components of user experience. Alignment amongst a team comes from consensus, spoken or unspoken, with regards to a particular proposal.

Lastly, all these authors present user experience as somewhat paradoxical. User experience is specified precisely as a concept that escapes precise or deliberate specification. In early instances, user experience as actual use functions rhetorically as much as literally outside of the specification process. In later instances, authors theorize user experience as a remedy for historic oversights and gaps, but also theorize user experience as difficult to pin down or to completely demarcate. This paradoxical definition should not be read as either a lack of sophisticated language or as a failure to unify various aims with regards to the development of products, nor should under- or unspecified ideas be labeled as simply subjective, and so un-impactful with regards to the definition of products. Such readings of these texts assume that product development is objective and predictable. Objectivity and predictability are not the goals of user experience. Instead, user experience scholars and practitioners cultivate this sense of imprecision as a way of maintaining user experience as distinct from other disciplines, such as marketing, engineering, and other attentions within design. Within the literature, this cultivated imprecision stems from claims that user experience operates beyond the scale of previously narrow (and so rigid, definable, and quantifiable) definitions of a product's success. This expansive, changing, and fuzzy scale resembles Buchanan's notion of wicked problems (Buchanan 1995b) or Simon's desire for a bound rationality. (Simon 1996) In this regards, the language and concepts of user experience contrast

legacy notions that underlie contemporary product development business like total quality (Ciampa 1992), which valorize quantification, conservatism (i.e. risk management), and market viability. User experience is, then, not just subjective, imprecise, holistic, or otherwise lacking well-definition; user experience is constructed as such to account for the very ways products, their use, and the context of use escape generalization.²²

Amongst Business, Design, and Experiences

One outcome related to user experience is the rise of strategic design initiatives. Where UX design focuses on the domain of design (namely interaction design and HCI), strategic design initiatives focus more on the professions of management and strategic planning rather than design professionals (Verganti 2009; Utterback et al. 2006; R. Boland and Collopy 2004; Brown 2009; Lockwood 2009). These texts evangelize the power, worth, and usefulness of design as a strategy for innovation. Highlighting design as integrative and creative, strategic design initiatives, as these authors argue, offer companies competitive advantages within changing and saturated markets by exploring products in new ways. What is striking across these texts, as will be explained, is that design, loosely defined, is positioned as a panacea for failed ventures, poor corporate culture, and absent revenue. The assumption, according to strategic design initiatives, is that the problem within companies is creativity—unearthing a brilliant idea. At the organizational level, design offers a means to *find* the next great innovation. Withholding

²²Interestingly enough, the descriptions and critiques of UX design often use the same language, such as fuzzy, fluid, or subjective. These are also highly feminized terms. Coincidentally, many of the UX professionals at LTC are women. While I knew these facts, only much later in writing did I see the relationship between the language used to describe the field and gendering of the profession at LTC. More work **needs** to be done with regards to UX design and gender, both from the theorization of UX design and practical accounts of women in the computational technology industry. Realizing this insight so late is a huge regret.

critique of the underlying assumption (that the issue is creativity), the question for the time being is *how does design do this exactly?*

In an article in the Harvard Business Review, Tim Brown, CEO of the prominent design consultancy IDEO, writes:

Leaders now look to innovation as a principal source of differentiation and competitive advantage; they would do well to incorporate design thinking into all phases of the process. (Brown 2008)

Unlike the 1990s concepts of total design (Pugh 1991) and total quality management (Ciampa 1992; Hugu 1990), which focused on cost reduction, products reliability, and more efficient internal execution, Brown explains that companies must innovate to remain ahead of their contemporary market competitors. Design thinking, according to Brown, is the preeminent innovation strategy as it provides methods and language within companies to offer products that are valued by users. Design thinking does so by engaging new professions in design activities—such as managers prototyping and sketching or multi-disciplinary teams engaging in field studies—and structures an entire process of product development from ideation to release. Brown provides examples of how both traditional industries engaged in product development and non-traditional industries, such as health care, can leverage these methods and techniques to better address problems and opportunities. Brown writes, "these skills [of design] now need to be dispersed throughout organizations [... and] move "upstream," closer to the executive suites where strategic decisions are made. Design is too important to be left to designers." (Brown 2009) As such, companies institutionalize and distribute activities to reinforce the markers of differentiation—those market-viable characteristics related to value claims within products, services, or systems.

While Brown demonstrates examples of how design thinking has worked for companies like health care provider Kaiser Permanente and bicycle parts manufacturer Shimano (Brown 2008; Brown 2009), he elides the obvious work required to have companies "incorporate design thinking into all phases of the process." (2008) The work of incorporating design thinking in such a way is by no means trivial and includes the redefinition of various jobs, responsibilities, and tasks. Likewise, incorporation requires that different departments and teams, at the very least, be able to work together. In instances where incorporation means hiring the necessary professionals, organizations need skill in hiring skilled people to fill organizational gaps (and so, require the skill of assessing unfamiliar skill). Even more, Brown forgets the most simple requirement of such implementation: the recognition and cultivation of *good* ideas. While design thinking can offer new ways to approach business strategy, it is not inherently productive of innovative ideas as it is *but an approach*.

Similar to Brown, scholar of innovation, Roberto Verganti writes:

When a company proposes a radical change in meaning, analysts often reject it as crazy or outlandish. That is not a surprise. A design-driven innovation, by definition, differs substantially from the dominant meaning in the industry. When analysts eventually acknowledge that a proposal has become a success, they call it a fluke. (Verganti 2009)

The excerpt illustrates a characteristic bullheadedness within the technology industry, here under the guise of the trope of the lone, tortured entrepreneur. For Verganti, design means something akin to radical, disruptive, or industry-leading product development. Design-driven innovation is not the only way to innovate. According to Verganti, design-driven innovation differs from user-centered innovation (which he conflates with market-

led innovation²³) and technology-led innovation (what might alternately be called invention). According to the author, these other modes of innovating have diminished or unsustainable returns, and do not capture new market opportunities. Design-driven innovation strategies require companies to propose "radical innovation of meanings" with regards to products, and, while risky, these "unsolicited" innovations can lead to significant advantage against competitors. (Verganti 2009) Verganti asserts design-driven innovation comes from a company's vision that cannot be validated by the market, and so stems from a process of interrogating thought leaders and style-makers. Most strikingly, Verganti argues that "[d]esign-driven innovation is not about being creative [but] [r]ather, it is about setting a direction and investing in relational assets." (Verganti 2009) In other words, Verganti claims that design-drive innovation, when done well, produces such radical innovation as an output. While Verganti outlines a three-step process—listening, interpreting, and addressing—this process is both generic and severely oversimplifies matters of execution.

In their book *Design-Inspired Innovation*, Utterback et al. (Utterback et al. 2006)

write:

Product and service design should not be an isolated function within a company. Rather, it should involve every single aspect of the company working together on the entire customer experience. (Utterback et al. 2006)

²³One of the most confounding statements appears in the first chapter. Verganti writes, "the first finding from my investigation is that radical innovation of meaning doesn't come from user-centered approaches. If Nintendo has closely observed teenagers using existing game consoles, it probably would have improved traditional game controllers, enabling users to better immerse themselves in a virtual world, rather than redefining what a game console is. [...] User-centered innovation does not question existing meaning but rather reinforces them, thanks to its powerful methods." This statement grossly misinterprets the ways user-centered methods are used. Verganti cherry-picks the Nintendo Wii as an example of success without addressing that his interpretation assumes that user-centered methods have no language to deal with aspirational values (wanting to use the body during gaming) or observations of social situations (gaming as a non-individual activity). While my interpretation is by no means more valid, it does point out that his example lacks critical justification of its conclusion.

Again, the authors advocate for the wider recognition of design within companies, and so the distribution of the process of negotiating what a product is and how its creation fulfills a need. Like the other two texts, the book spends most of its time dwelling on successful innovations and outlining vague methods of how one goes about doing such activities. The first page of the book exemplifies the way the authors tantalize the readers, presumably business executives and managers:

A design-inspired product delights the customer. [...] Great products are those that have grown in meaning and value over their—and generations of users’—lifetimes. They capture our hearts and make our lives easier, better, or more interesting. Elegant products live on long after trivial variations have been relegated to the trash heap. (Utterback et al. 2006)

To reiterate, all of these texts position design as a panacea for failed ventures, poor corporate culture, and absent revenue. As such, design is both a simple process that anyone can do and a mysterious incantation that magically produces innovative ideas. While the authors do mention processes and outline methods, these blueprints resemble designing as much as any systematic process of inquiry might. The specificity of designing is lost, especially its core activity: the use of product depictions to propose and negotiate *that-which-does-not-yet-exist*. While the aim is to empower and acknowledge design as important, these books essentialize design by reducing it to a synonym of creativity or innovation, and misinterpret the core activity of design. Instead, design becomes a flat label for any product, service, or system that is successful and so deemed innovative. While one might become enthusiastic about design after reading one of these texts, it is unclear what comes next.

The underlying assumption of strategic design initiatives is that creativity is the missing link when it comes to a company being innovative. Accordingly, innovation is a

matter of generating ideas and then selecting the right one. However, creativity is a misleading term as these authors do not, in the end, advocate for more ideas, but ideas coming from particular groups, namely managers and executives. While these authors detail the ways designers collaborate and negotiate in non-hierarchical ways, strategic design initiatives fundamentally depend on hierarchical models of management. Strategic design initiatives, at least in writing, displace a re-centering of power and reification of labor by focusing on market leadership and innovation rather than internal corporate politics. Management sociologist, Sam Ladner critiques design thinking for precisely these violent oversights. He explains that a "[m]anagers' ability to control both the organization of work and the availability of consumer goods is the true problem [with design thinking], not an inability to think 'creatively.'" (Ladner 2009b)

In writing about technology development, feminist STS scholar Lucy Suchman argues a similar point to Ladner:

For technology designers and developers, the basic change implied by rethinking the technological object is from a view of design as the creation of discrete devices, or even networks of devices, to a view of systems development as entry into the networks of working relations – including both contests and alliances – that make technical systems possible. This represents a change insofar as the prevailing order of technology production is based not in acknowledgement and cultivation of these networks but in their denial, in favor of the myth of the lone creator of new technology on the one hand, and the passive recipients of new technology on the other. The fact that this myth belies the lived reality of systems development and use has so far gone largely unchallenged, as has the simple designer/user opposition that underwrites the myth. (Suchman 2003)

Applying Suchman's insight, the notion of creativity effaces of the many contributions that make up the design and development process. Strategic design initiatives, according to Brown, Verganti, and Utterback et al., and still others (Nussbaum

2013; Acklin 2010; Cruickshank 2008; Lockwood 2009), problematically ignore the environment of these initiatives and the workers within these environments. Ladner writes elsewhere, "Simply describing design thinking in action does not explain how and in what ways it flourishes. To truly embrace design thinking as a management tool, designers and managers must develop two new intellectual lenses: an awareness of culture and a framework for power relations." (Ladner 2009a) Ladner and Suchman both advocate for understanding the work environment and locating accountabilities (Suchman 2003) within this environment to understand how new approaches lead to new ways of working.

The present research looks at design work to understand how such initiatives are engaged in everyday, and often deeply mundane, work. On one side of design work are those activities of work called design; on the other are those activities of design called work. Between these vectors are other activities that Gorb and Dumas have called "silent design," (Gorb and Dumas 1987) or activities that are excluded from formal design processes and discussions but are required for the process to function. These silent design activities include product management work (e.g. emailing clients), unspoken tactics to gain alignment (e.g. getting feedback prior to presenting), or the informal ways designing occurs in artifacts (e.g. presentation slide decks). These activities often escape recognition since they are labeled as nothing more than the way work is done. That is to say, design, when integrated, often looks less spectacular than the strategic design texts claim. While the generation of new ideas is a component, creativity is more often a minimal portion of design in comparison to the vast amount of work not mentioned by these authors. Verganti denies access to this work by saying he uses the term design

rather than development because design "denote[s] a greater focus on the generation of new ideas rather than pure technical implementation, and more conscious attention to user needs." (Verganti 2009) While Bucciarelli and Schön may agree that design communicates such things, I would argue they would also agree that development is anything but pure technical implementation.

This view of design as the creative discipline (and other professions or activities as not) is troubling for a variety of reasons, several of which are raised as motivation to move forward. First, assuming that design leads to innovation conflates designing with innovating. As such, engaging in something labeled design (even if wrongly labeled design) imports a whole host of undue language that claims what has been made is novel and offering something unseen. Ideas are given credence as successful innovation or discussed in terms of the market not yet being ready. This language negates complex understandings of product development and leads to gross overstatements.²⁴

Assuming that all work outside of the design activity is simply execution devalues the work of others as much as ignores that this work is, in fact, creative. The second motivation to study UX design as a strategic design initiative is re-valuing work. Without asserting that all creativity is equal, various types of creation and design nonetheless exists. To Suchman's point, denying the distribution of creativity and the reliance of creation on a variety of contributors reduces the creative act to that of defining the vision for a product. In turn, mythologizes design. This mythology ignores concepts within

²⁴Verganti recounts a particular lamp created under the premise of rethinking what lamps might do within domestic spaces. While the lamp is highly regarded according to his account, he writes, that the lamp "shifted people's attention from a fixture to the light it creates, [and] overturned the reason people buy lamps." (2009) This generalization that people now buy lamps differently is simply untrue for a host of reasons, namely that utility still remains the primary reason most of the world buys lamps.

design studies of design as a propositional activity, and that to make a product requires continual re-alignment and negotiation.

Assuming design means innovation means designing takes place at the beginning of the product development process. A third motivation is to understand how design occurs elsewhere in the development process. When design becomes a purely cognitive function, all other work becomes simple execution—plans (i.e. designs) are executed upon in a manual or rote way. Others have argued that this view of design as cognitive is fallacious (Kimbell 2011; Kimbell 2012; E. S. Goodman 2013). These authors focus primarily on the activities of designers in traditional settings (i.e. design firms and consultancies) and claim that these activities involve a host of material processes. Taking up these arguments, the claim here is slightly different. While designing is not purely cognitive, the remaining work of execution is not simply material, rote, or manual. (Suchman 2000) By placing these activities outside of the processes of design wrongly labels this work as rote and thoughtless, leading in certain instances (Chapter 5) to disruption within a group and denial of design itself.

The following empirical accounts explore these points in greater detail. Using the frame of design work to catalog the particular gaps between the envisioned initiative and its implementation, the accounts reflect on the dilemma of orchestrating design across a variety of disciplines (in this case, user experience design) while simultaneously trying to isolate, standardize, and retain some single vision. Even more, the following accounts take on Ladner's suggestion of exploring the mechanisms within an organization that underlie strategic design initiatives, particularly mechanisms related to power (Chapter 6) and to the operating unit of a project (Chapter 7). The subsequent accounts argue that our

notions of how strategic design initiatives occur lacks an attention to the materiality of designing. As such, the activities of designing must find ways to co-opt, adopt, or subvert these institutional mechanisms.

CHAPTER 3

AN ETHNOGRAPHY OF PRACTICE

STUDYING THE DOINGS, SAYINGS, AND MATERIALS OF USER EXPERIENCE

This chapter defines the methodological commitments of the case study and the particular methods used during data collection, analysis, and writing. Starting with practice theory, the chapter outlines practice as a unit of analysis. Practice is then related to emerging efforts within design studies. The aim of the first part of the chapter is to outline the stakes of practice theory and the usefulness of orienting toward practice when researching design.

The second part of the chapter explains the data collection, analysis, and writing process of this case study. As these accounts are based on first-hand observation and semi-structured interviews, the written accounts come from the synthesis of notes. On top of the analytic strategies, several measures were taken to ensure the privacy of employees at LTC and protect proprietary information about LTC. All of these strategies and measures are explicated in detail.

A Turn Toward Practice

As a discourse and topic of study, practice theory has roots in the social sciences. Sociologist Pierre Bourdieu, who coined the term, explains that these roots stem from ongoing debate about objective and subjective phenomena, or "the ritual either/or choice between objectivism and subjectivism" within the social sciences. (Bourdieu 1977) This division of objective observation and subjective experience presents a dilemma with regards to theorizing how people come to act and know in the world. Bourdieu's contemporaries in the social sciences tended toward formalizations, such as structural

anthropology or semiotics, which emphasized the observation of orders, mechanisms, and scaffolds to explain social phenomena. For Bourdieu, such formalisms were paradoxical—why was a trained anthropologist or sociologist better at apprehending the mechanisms of social phenomena than an individual living and producing such phenomena? The division between observation and action, or knowing and doing, could not account for "the mode of production and functioning of the practical mastery which makes possible both an objectively intelligible practice and also an objectively enchanted experience of that practice". (Bourdieu 1977) As such, prevailing social science theories created differences between the description of phenomena and the activity itself. Instead, Bourdieu proposed a theory of practice to explain how social order arises from the legible environment, everyday routines, and shared values.

Practice theory focuses on the "embodied, materially mediated arrays of human activity centrally organized around shared practical understanding." (Schatzki 2001a) To study practice is to study how the world around action composes, configures, and coordinates action and knowledge without requiring additional structure for this action to be comprehensible. Bourdieu uses the terms *habitus* and *doxa* to explain practical social orders. *Habitus* refers to "the durably installed generative principle of regulated improvisations" that stems from "history turned into nature, i.e. denied as such". (Bourdieu 1977) Bourdieu explains that the *habitus* sets action, giving rise to legible-but-tacit rules and a palette of possible courses of action that is distributed into the environment of action. *Doxa*, on the other hand, refers to the undisputed ideological components of practical activities, which give rise to notions of good and bad (orthodoxy and heterodoxy) and opinion (discourse). Practical understanding is, then, not determined

by fixed and knowable rules, structures, or skills, but by material and cultural arrangements that tend toward, though do not determine, particular causal actions.

Contemporary discussion of practice further elaborates on Bourdieu's notions.

Jean Lave explains in the introduction to an early compilation on practice:

[W]hereas action is typically viewed as a direct, unmediated connection between person and environment, in an activity theory perspective there is always a more complicated relation that mediates between them. In particular, operations, the way in which the goals of actions are implemented or carried out under particular situated circumstances, have no intrinsic meaning of their own. Meaningful actions, entailing complex relations with(in) societal activity systems, give meaning to operations. (Lave 1996)

While Lave refers to activity theory—a theoretical framework founded in psychology—rather than sociological practice theory, Lave refers to the same underlying issue developed in a theory of practice. Rather than conceiving of goals and actions as existing in an abstract sense, activity and practice theory situate knowledge and action (i.e. practice), and look to the material constellation in which action occurs to provide meaning, boundaries, and causality. (Schatzki 2001b; Barnes 2001) Where activity theory traces the accomplishment of goals through an array of particular and available resources (Nardi 1996; Suchman and Trigg 1996; Keller and Keller 1996), practice theory focuses on the sociality of an activity and the accomplishment of coordinated and shared goals.

The main inquiry of practice theory focuses on the "embodied capacities such as know-how, skills, tacit understanding, and dispositions." (Schatzki 2001a) Action "must be understood not as a mere enactment of practice, but as its knowledgeable, informed and goal-directed enactment." (Barnes 2001) In other words, practice theory attempts to explain *how* action occurs as well as *why* it occurs. Beyond conceptualizing the relationship between means and outcomes (i.e. how goals are accomplished), practice

theory attempts to narrativize means and outcomes as constitutive expressions of culture/community, that is, as sociality itself. In short, practices express and constitute sociality.

An important feature of practice is the notion of correctness (orthodoxy). Underlying discussions of correctness is the proposition that all practices are, in fact, collective, regardless of their enactment. As such, a theory of practice demands some notion of collectivity and coordination (i.e. sociality). Contemporary sociologist of practice Theodore Schatzki explains that practices are composed of two dimensions, activity and organization. (Schatzki 2001b) The first dimension accounts for "the performances of doings and sayings." The second dimension accounts for the meaningfulness of these performances, that is, how one says what they are doing corresponds to a practice. Schatzki identifies three structural features of how activities are organized—"a pool of understanding, a set of rules, and a teleoaffective structure." (Schatzki 2001b) The first and second features refer to Bourdieu's notion of regulated improvisation (1977), i.e. what an activity is (domain and field knowledge) and how is it conducted (skills and competencies). The third feature qualifies activities through their proper accomplishment—how one goes about doing something to reach an end (causality) and how well that particular performance meets those causal requirements (orthodoxy/heterodoxy). In this respect, practices are done well or poorly, and these determinations are locally assessed by other practitioners.

Praxiography

A particularly illustrative study of practice is Annemarie Mol's account of atherosclerosis. (2002) In this text, Mol sets out to study the disease atherosclerosis by

following it as an ethnographer. She sits in on patient meetings; she visits different labs where tests are being run; she witnesses various approaches to treatment. In doing so, Mol finds that atherosclerosis is not just attended to by these different perspectives, but in fact differently composed by them. As such, the disease is made present through a variety of means: through daily activities now rendered impossible for a suffering patient; through the workout routine recommended by a physical therapist; through the diagnostic routines of surgeons; through the microscope of a pathologist gazing upon amputated tissue. For Mol, atherosclerosis is not a singular disease in the world that has one ultimate solution. Instead, atherosclerosis is multiple things when understood through how it is performed, that is, through its practice. What Mol means is that atherosclerosis, from diagnosis to treatment, composes and is composed by a constellation of objects, activities, scenarios, and discourses. In Bourdieu's terms, atherosclerosis is knowable as something that is knowable through the habitus (i.e. the domain specific materiality of various practitioners) and the doxa (i.e. the disciplinary skills, ideas, dispositions expressed by and through words and actions). Atherosclerosis, and more generally medicine, is practiced—materialized, disposed, and performed. Atherosclerosis comes to be known through the ways it is treated, lived with, diagnosed, and expressed.

Mol's account offers more than just an illustrative example of what is meant by practice. Mol engages in a methodology she refers to as a praxiography, or an ethnography of practice. This methodology is used in the study of LTC. Praxiography is not all that dissimilar to ethnography. The primary data record comes from first-hand extended observation of an activity. This observation is recorded in some fashion (typically through written notes) and analyzed for thematic similarities across notes.

(More will be explained below about ethnographic methods.) This primary data is complemented by more directed interview data, where the ethnographer probes areas to clarify observations or emerging themes.

The main difference between ethnography and praxiography is the focus of observation. Through a reflection on how a pathologist explains his process of identifying atherosclerosis from amputated tissue under a microscope, Mol explains her methodology:

My ethnographic strategy hinges on the art of never forgetting about microscopes. Of persistently attending to their relevance and always including them in stories about physicalities. It is with this strategy that disease is turned into something ethnographers may talk about. Because as long as the practicalities of doing disease are part of the story, it is a story about practices. A praxiography. The "disease" that ethnographers talk about is never alone. It does not stand by itself. It depends on everything and everyone that is active while it is being practiced. This disease is being done. (Mol 2002)

What Mol means in this reflection is that ethnography focuses primarily on the writing of anthropocentric notions of culture. As a result, the object of study is people, and what people do and say. For praxiography, the object of study is practice itself, where people, microscopes, hospitals, rehabilitation routines, and tissue come to the aid of understanding what constitutes this object of study. For Mol, her goal is to unravel the sociality of medicine, medical practice, and disease. Praxiography provides a way for Mol to unearth the social practices of treatment without claiming that there is some ultimate truth. Instead, for Mol, diseases are not treated per se, but rendered into existence through a constellation of matter.

Practice Theory in Design Research

The term practice has long been present within design scholarship. Often when authors refer to design practice they mean *actions designers take or the professional (as opposed to academic) implementation of design*. (Väänänen-Vainio-Mattila, Roto, and Hassenzahl 2008; Cash, Hicks, and Culley 2013; Rohn and Wixon 2011; Zimmerman, Forlizzi, and Koskinen 2009; Buchenau and Suri 2000) This colloquial usage of design practice is not what is at issue here.

In recent years, practice (theory) has found footing in design research, human-computer interaction, and design studies. Rather than focusing on the design as a practice, the bulk of this writing focus on practice as a unit of design. (Shove 2007; Julier 2007; Disalvo, Redström, and Watson 2013; Kuijer, Jong, and Eijk 2008; Ingram, Shove, and Watson 2007) The practices being studied are, then, those of the user rather than the designer.

In a demonstrative article about practice-oriented product design, Guy Julier writes that his goal is "to provide further suggestions for how designers might use practice theory, both in identifying and exploring design opportunities but also in understanding where perceived opportunities may not function so efficiently in reality." (Julier 2007) Julier uses the example of how teens use iPods to illustrate the value of a practice-oriented approach. The example highlights how the iPod, different mp3 players, and other devices entwine within a field of sociality, self-representation, and habit. Rather than trying to understand ergonomics, task completion, or more direct notions of use, a practice-oriented approach reveals a more complex, situated, and contingent notion of music listening. Julier reflects that:

The identification of what constitutes specific practices provides a useful conceptual framework that takes the designer beyond the individual user

to understanding the constellations and dependencies that link objects, environments, systems and users together. By analyzing the 'suites' of contingent objects [...] on the one hand and the knowledge, understandings, bodily activities and states of emotion that are shared between users on the other, the designer may start from an enriched awareness. (Julier 2007)

Absent from Julier's recommendation to shift the unit of analysis are the consequences such a shift demands. While Julier illustrates the value of complexifying the working assumptions of designers by focusing on practice, the implications are more wide-reaching than simply *thinking differently*. In short, starting with "an enriched awareness" extends long before and after the direct observational activities. In the particular case of understanding the iPodding habits of teens, Julier elides the necessary work of collecting, analyzing, and representing his findings. This work is how awareness is systematically and rigorously enriched. The particulars of these research activities are bracketed away, and instead the discussion focuses on the digested design implications for iPodding. The very phrase *an enriched awareness* dematerializes collection, analysis, and representation (amongst other activities) by transforming this work into purely an information problem. While the end result may be a more holistic perspective on contemporary music listening habits, this perspective depends on concrete, situated, and embodied work on the part of designers and researchers. For example, to study the practice of iPodding demands a different ways of observing (e.g. extended studies, shadowing, and interviews), new modes of analysis (e.g. attention to data using new categorization schemes), and different representations (e.g. relational diagrams). These early stages might be the same categorically—say, as (user experience) *research*—yet the activity of research has significantly changed.

Goodman, Stolterman, and Wakkary (2011) reflect on this over-emphasis on the practice of users rather than the practice of designers. They trace the seemingly perpetual claims within HCI discourse that interaction design professionals do not incorporate the findings of academic HCI researchers into their work. The authors argue that "this disconnection in part emerges from a persistent failure to adequately address the lived complexity of design practices." (E. Goodman, Stolterman, and Wakkary 2011) They continue:

HCI's research commitment to systematic analysis of how people make use of technologies is well-known. Yet there has been much less attention paid to understanding the diversity of environments in which design takes place. This inattention, we propose, results from an assumption that the social worlds and epistemological beliefs of the imagined "users" of HCI theories and frameworks—in particular, professional interaction designers—are largely identical to those of the researchers producing them. (2011)

Goodman, Stolterman, and Wakkary reframe the problems within design scholarships as an inattention to the materiality of design—the diversity of environments, cultures, and resources of/for designing. To reconcile the divide, the authors introduce practice theory (Bourdieu 1977; Schatzki 2001a) as a way to theorize (interaction) design through its execution. Unlike studies of the design process (Gero, Tang, and Science 2006; Cascini, Fantoni, and Montagna 2013; Peeters et al. 2007) or design cognition (Lawson 2005; Dong, Kleinsmann, and Deken 2013; Suwa and Tversky 1997), both of which tend toward controlled experimental settings, studying design (as a) practice attends to the particularities of the settings of design, building an empirical theory of (interaction) design. Unlike studies of the practice of users, Goodman, Wakkary, and Stolterman gaze inward toward how designers work rather than simply what they know. These authors propose that practice theory offers a way to empirically theorize

design(ing) that accounts for intent and context without introducing unnecessary structures to account for the activities as orderly. The present case study aligns with this approach and work advanced by Goodman about the setting of designing. (E. S. Goodman 2013)

Methodology

This section details data collection and analysis. For the present research, strategic design initiatives will be understood at the scale of the human and non-human participants rather than from the scale of management or strategic planning. Praxiography provides insight into how organizations accomplish such initiatives on a daily basis through the activities of work.

Participant-Observation

The present research relies on two methods of data collection to study the practice of UX. The first is participant-observation. Participant-observation is a style of ethnographic data collection and reporting that relies on first-hand, embedded accounts that has a tradition within design studies and design research. (Bucciarelli 1988; Button 2000; Salvador and Wagner 1999; Wasson 2000) Participant-observation requires two main actions. First, a researcher participates in activities. In doing so, the goal is to take an internal stance toward the meaningfulness of such activities within a culture. Second, a researcher reflects on these activities through writing, photography, or other means. Before, during, and after participating, a researcher takes notes (jottings) of the occurrences. These notes are both documentary and reflective, and provide record of what occurred from the researcher's subjective experience of it. By maintaining a

reflective stance toward participation, a researcher aims to document on both the familiar and unfamiliar.

Participant-observation provides a vantage point that allows researchers to comment on the ways acculturated peoples finding meaning in their actions, objects, and relationships. (Geertz 2000; Bucciarelli 1996; Wasson 2000) Through the hybrid stance of engaging and reflecting, participant-observation assumes that meaning is constantly produced through the practices of a culture. The products of participant-observation are rich accounts of culture, or what Clifford Geertz calls "thick descriptions." (Geertz 2000) These descriptive accounts are not generalizable to theories of culture or practice, but instead focus on the particular processes by which collectives adhere. In this respect, participant-observation is useful to the present study as it foregrounds processes of ordering within a given collective.

The participant-observation phase of the research took place from June 3rd 2013 to December 13th 2013. During this period, I participated as a user experience researcher through an internship program at LTC. I worked directly with the lead user experience researcher (Katrine) in the Personal Computing Team (PCT) at LTC. As such I contributed and participated in the daily work of being a user experience researcher, and observed and interacted with a variety of other roles within and outside of the group—managers, marketers, designers (UX and industrial), engineers, and strategic planners. Throughout the day and after work I took notes about meetings and activities. The bulk of the notes were focused on meetings as well as group work. Due to my access within LTC, I took notes only within a select group of ongoing projects in order to be able to compare over time and across stages of work.

Semi-Structured Interviewing

The second method of data collection was semi-structured interviewing. *Semi-structured* interviewing refers to interviews that followed a simple format but did not necessarily ask the same series of questions or probe the same issues. As a point of comparison to the participant-observation, the semi-structured interviews focused on how people present and articulate their understanding of user experience. The interviews asked employees to reflect on UX both conceptually and in anecdotal accounts of their work.

The semi-structured interviews came second to participant-observations in that they often referred to past activities. The interviews were conducted with employees at LTC within PCT. Interviewees were selected based on their involvement with projects in which I had participated. I interviewed 15 people ranging from managers to user experience researchers to marketers. The purpose of these interviews were to explicate comments and stances various people had toward user experience design. Interviewees were told upfront the purpose of the research was to understand user experience from a variety of perspectives. I encouraged the interviewees to question the motives of the research. To structure the interview, I often grounded the interviews in particular accounts from my field notes.

Analysis

These sets of data were analyzed through two rounds of coding. After a full reading of all the field notes and interview transcripts, interview transcripts were summarized, thematized, and compared in an open coding scheme. During this round of coding, themes were developed through multiple passes. During each pass, themes were

generated and applied to transcripts, and grouped based on shared qualities, such as temporality and professionalization, or shared activities, such as delegating tasks and educating others on the purpose of UX. At the conclusion of this round of coding, the themes were grouped based on mentions the dimensions of practice—rules, knowledge sets, causality, and activities. These open codes were compared for frequency and compared with existing literature about user experience and design. A subset of codes were selected for a second round of coding the interviews and field notes based on identifiable gaps between literature and observations. This second round of coding led to a refined list of codes that focused on mentions of materials, contingencies, positive/negative modalities of work (Latour 1987), and comparisons of approaches to technology development. After a round of comparing codes (memoing), the three empirical accounts were selected as representative of three major themes—issues related to components and wholes, and their impact on project times (Chapter 5); issues related to institutionalization and professionalization of user experience (Chapter 6); issues related to decision-making between established processes and new processes (Chapter 7).

Writing the Accounts

In order to write these accounts of practice, I took several measures to ensure the privacy of LTC and its employees. LTC is a pseudonym, as are the names of all the employees. The titles of employees (e.g. product marketing engineer or user experience researcher) have remained as-is. The particular products that LTC made are not mentioned by name or form. LTC's industry (computational technology), processes (ingredient manufacturing, design, and engineering), and products (various components) have remained as-is, though in a general sense. Historical accounts have been abstracted

to hide the identity of LTC, employees, or products. The names of projects (such as the exemplar units project in Chapter 5) has been changed to remove identifying language.

For the many projects, details have been changed in order to protect proprietary information about identifying or unreleased products. For those products that are public knowledge, the details have been purposely obscured to protect LTC. In Chapter 5, the project has been abstracted without changing the underlying purpose or project of a detachable laptop. In Chapter 6, the internal report has been changed to protect LTC's identity. In the case of Chapter 7, the product (codename: PixelTouch) is a combination of abstractions of purpose and similar-though-contrived features. These accounts in particular aimed to summarize the overall feel of the project while offering a different example.

In the many accounts of meetings, liberties have been taken to simplify the narrative. These judgements were based on the coding system, and exclude aspects of written account or transcripts that do not fit within a theme.

Interview transcripts are presented verbatim from audio recordings, save any identifying information of LTC, its products, its competitors, or its collaborators. Transcripts from meetings are based on field notes, and are written from notes rather than recordings. These exchanges are paraphrases by virtue of the method of writing. Slides or other primary source material have been anonymized and any identifying references have been removed or changed. In all of the instances of removal or redaction, square brackets are used ("[]") to indicate the author has changed the details.

The images are based on sketches and notes, and are emblematic of the actual devices (Chapter 5) and softwares (Chapter 7) only to the extent of the de-identified

written accounts. For Chapter 5, the device the account is based on was a detachable, though with several redacted differences. For Chapter 7, the software is altogether synthesized in purpose and use, though retains the basic features of being a touchscreen technology.



The present case study focuses on the practice of user experience design ("doing user experience design") as a way to unravel the sociality of design work. As the previous chapter explained, user experience and design are not the same thing. For the case study, user experience provides a focal object within the ethnographic accounts to reflect on the way design work takes place. More than just a method to use, praxiography connects to the ongoing critique that argues design scholarship fails to theorize, or theorize from, the contexts of designing. By approaching the case study as a study of practice, the constellation that formulates design practice (what might be called the work setting) comes to the fore as participating in designing.

To reiterate, the purpose of this case study is to understand how the context of design renders designing as a particular, rather than generalizable, work activity. In this, the goal is to unpack what work activities count as designing and what design activities count as working. User experience provides a focal object to explore the activities of designing. This exploration questions the recent attention given to design as a way to help companies, government, and a slew of other organization innovate. (see final section of Chapter 8) While many have turned to design as an activity and discipline that holds potential insight for new domains, very little of this attention has been given to the relationship design and the context itself. Advocates of strategic design initiatives have

assumed that the problems of implementation stem from inadequate understanding, poor management, or improper execution. (Best 2006; Nussbaum 2013; Brown 2009)

Critiques of these such initiatives (like design thinking) have likewise assumed that the problem stems from the project itself—creativity or innovation are not the issue in the end, but the re-distribution of power. (Ladner 2009b; Kimbell 2012; Kimbell 2012)

However, the present case study argues that both of these formulations are inadequate as they assume that the activity of design (*designing*) is static and not determined by and through a socio-material setting. A richer understanding of design work with an attention to the socio-materiality of design provides substantive ways to interrogate what strategic design initiatives are offering new settings and what might need to change.

CHAPTER 4

WELCOME TO LTC

The empirical accounts took place at a technology company called LTC. This chapter provides a background and introduction to LTC. The goal is to describe a few key dimensions of the company in order to set up the empirical accounts. These dimensions are: (1) what LTC makes, (2) what LTC is like as a working environment, (3) at what scale does LTC function, and (4) how UX is perceived at LTC. As a baseline for the empirical accounts, these dimensions distinguish LTC as a particular company. These dimensions are far from complete with regard to all of the processes of LTC, but instead offer grounding to highlight key points about design studies.

LTC makes ingredients for computational systems

Established during the decline of mainframe computing, LTC began by making data storage for computational systems. LTC led the industry with several foundational innovations to the way computational components were designed, one of which was contributing to the introduction of system architectures. During the era prior to such architectures, LTC made parts for computational systems that were designed specifically for the type of system being developed—for instance, memory specifically designed for a weather modeling mainframe computer. Over time, LTC realized that many of these systems had ostensibly the same features though with different applications. As such, system architecture allowed LTC to move away from designing a variety of purpose-built parts and toward manufacturing reconfigurable parts. This realization helped standardize and compartmentalize how computing systems worked. More importantly for LTC, the concept of system architecture made computational systems into a series of parts that

could be designed and developed in parallel. Thinking of a computer as a series of interlocking parts greatly reduced the number of products LTC made, as well as simplified the requirements for each product. Within a computing system, parts now had explicit system functions rather than explicit applications, allowing them to be used in multiple systems without reengineering. For example, by splitting graphics processing (GPU) from the central processing unit (CPU), each part could be used in multiple systems independently. In short, LTC became very efficient.

Both within and outside of the computer industry, LTC came to be known for contributing to the rapid pace of change of computers. Co-evolving with personal and business computer manufacturers, system architecture made LTC a leader within the field. Even more, each generation of hardware made the previous generation obsolete, thereby staying ahead of competitors and cornering the market for high-end parts. As a result, and by no means the only implication, the number of products LTC offered shrank while the number of applications grew. Not surprisingly, these efficiencies also contributed to LTC's growth as a company.

While at LTC, many employees referred to LTC as an ingredient company. What they meant was that LTC made components—or, ingredients—that could be used and combined within computing systems. Like a cooking ingredient, the products LTC made were only pieces of a computational system rather than the whole system itself. This particular aspect will be important during the discussion of the exemplar units project (Chapter 5) as well as the PixelTouch project (Chapter 7).

Another way to talk about system architecture is what employees referred to as *componentization*. Componentization refers to the construction of computational systems

as composed of discrete and interlocking parts, called components. Like the concepts of encapsulation and abstraction in object-oriented programming, componentization assumes that each component has an identifiable and discrete purpose, and components have input and output that allows them to be connected to other appropriate components. For example, in this model, the keyboard is a component. The keyboard is the sole device that handles typed input and produces discrete output that relates what a human perceives as the key (e.g. the letter G) and what the processor understands as a key (e.g. a signal from the middle of the keyboard). While there are more steps to having that G show up on the screen (e.g. the graphics cards and the screen itself, along with wires and software), the example points out that componentization assumes that ingredients, and the teams that make them, have an explicit purpose that is not shared by other ingredients or teams.

During my field work, componentization often referred to the work processes of teams or to systems as a series of components. However, componentization can also be understood as a strategic metaphor for understanding LTC as a company. Like building blocks, the various components—such as the graphics card, the heat sinks, the hard drive, and the CPU—offer a way to scale offerings along a series of fixed categories. The specialization of each component allows engineers in their specific domains—such as graphics, thermals, storage, and processor load—to focus on particular problems and ignore the rest of the system. Some aspects of cross-component input and output, teams were isolated units with highly efficient, and sometimes idiosyncratic,²⁵ ways of

²⁵In interviews with multiple employees, I learned about their history at the company. Often I inquired about their previous positions and how different groups worked. For those employees who bounced around the company, I learned they often had to acculturate to the particular team they were on. While their position remained the same, they found the relationships within the team and amongst teams were very different.

working. As such, componentization might be credited for many advances and innovations, especially with regards to increases in the complexity of computational systems. The increased complexity of these systems translated into LTC as a company. Currently employing over 100,000 people worldwide, LTC has an organizational structure that maps to the complexity of the ingredients they make. Even more, LTC is componentized in how internal organizations are grouped. For example, mobile computing is distinct from personal computing, both of which are separate from business computing. While LTC makes components for computational systems, these computational systems have also made LTC.

LTC doesn't sell to you or me (unless you are a company)

As much as LTC has been vital to the development of computational systems, LTC does not, for the most part,²⁶ make computers or finished systems. Within the personal computing market, LTC makes and sells ingredients; these ingredients are what LTC is known for and what makes LTC most of its revenue. LTC's customers are consumer electronics companies (referred to as original equipment manufacturers, or OEMs) and the other engineering companies that engineer and manufacture computers for consumer electronics companies (referred to as original design manufacturers, or ODMs). As such, LTC is distanced from the personal computing market and the user by at least one degree.

The relationship amongst OEMs, ODMs, and ingredient companies like LTC is less direct than it might appear from the outside. For personal computing systems, OEMs are the names on computers (e.g. Dell, Sony, Lenovo, and Apple). While these companies

²⁶LTC has, on occasion, made consumer electronics. These have largely been one-off projects, and do not constitute much of a revenue stream.

are who a consumer praises or derides for their latest product release, they are not fully sovereign over the decisions about the computers they sell. OEMs work with ODMs, who actually engineer and manufacture these personal computing systems. While ingredient companies, like LTC, sell to OEMs, ODMs still need to manufacture the product for the OEM. If something, like a new screen, requires retooling that is too costly or a process that is unproven (say, gluing a screen in a certain way to make the device thinner), ODMs can ostensibly refuse to produce computers they feel are too risky, costly, or challenging to manufacture. For ODMs, retooling machines takes significant time and energy, and producing, say, an innovative screen might reduce their profit by pushing back release dates or over-exhausting resources. Where OEMs make money from the selling completed devices to wholesalers, ODMs make money through contract agreements with OEMs for a particular number of units. A product that is risky in one way or another, whether that means retooling machines or the potential of a defect, presents an added cost for ODMs. If a particular screen mounting technique or hinge design is too specific as to not be repeated, the ODM sees the processes of manufacturing as sunk cost. ODMs make money from scale and repetition within these contracts. Reusing parts or processes, or minor retooling, leads to more profit. In this way, making a personal computer is a deeply social process. Ingredient companies need to convince OEMs that ODMs think an innovation is a good idea from the manufacturing perspective, as well as convince OEMs that their ingredients will bring value to consumers. The relationship amongst these parties is the impulse behind the account in Chapter 5.

LTC is a global corporation

When I first arrived at LTC, I was unsurprised by the Hampton Mills complex. It looked like most corporate complexes. A berm obscured the buildings from the road. A moat of parking lots circumscribed the buildings. Up close, the Hampton Mills complex was no more exciting. The facade was a grayish tone and the windows had a reflective UV coating. Save the logos that mark the entrances to the complex, nothing really distinguished this complex as foundational to all computing systems since the 1960s. The complex could house any type of company doing any number of things that can be handled by a desk and a computer—just another corporate building hidden from the noise of traffic. Simply put, the buildings were massive, impersonal, and partitioned. I recall commenting on the phone later that day that LTC looked like what I imagined a Corporation to look like. The complex was expected—LTC was a multi-national corporation at the end of the day.

Hampton Mills was rarely called *Hampton Mills*. Initiated employees referred to it as *HM*. I was located at HM3 from June to December of 2013. The HM complex was composed of 5 sub-buildings, numbered clockwise within the complex: HM1 through HM5. These alphanumeric labels peppered the typical talk of my colleagues (and quickly my own):

Today's meeting will be in HM2 instead of HM1.

Care to have lunch in the HM3 café?

My desk is on the third floor of HM5. Find me after the meeting.

Within a mile of HM were two other such complexes—Freemont Field and Green Briar. Like HM, these complexes were more commonly abbreviated as FF and GB, respectively. These buildings had similar generic exteriors, though differed slightly inside

due to the various departments. The biggest difference from HM was that both FF and GB housed access-controlled areas where resources were stored and fabrication occurred. I only caught glimpses of the interiors of these spaces as when I passed as the swinging metal doors teetered closed. Inside these areas were a mysterious and expansive whirl of forklifts and engineers costumed in hardhats and eye protection. Meetings commonly took place amongst these three campuses, and I routinely had to adjust my commute to arrive at a building other than HM3. While I found moving between local sites a common occurrence, traveling between buildings required planning and a car. The responsibility of these pilgrimages fell disproportionately on the marketing and design teams. The larger engineering cohorts were, I guess, less mobile.

Next to HM was a small airport where The Shuttle departed. The Shuttle was a private plane service that departed and arrived several times throughout the day for the also-common out-of-state meetings at the corporate headquarters, Ronald Court (RC). During my time at LTC, I frequently heard colleagues say, *I have a meeting today in RC2. I have to get on The Shuttle.*

The Shuttle was pointed out to me on the first day by a nameless employee. As we rode a different shuttle—from the public transit station to HM3—he pointed and said, *That's where The Shuttle leaves. It's free.*

This off-the-books encounter was one of the first times I realized the scale of LTC. The casualness and pride of this employee's comment—*The Shuttle [...] It's free*—pointed out a gap in what I thought it meant for LTC to be a multi-national corporation and what it actually meant to be a multi-national corporation. I never considered what having sites all over the world—all across the United States, in Asia, in South America, in

Europe—meant logistically for a company or even for teams working on a project. I naively thought teams worked in isolated units with all the necessary people and resources in close proximity. Upper management might travel a bit to periodically check-in on the progress of remote teams. In fact, until about a month into my time at LTC, I did not realize that two people on my team (one of which was my manager) were actually based out of RC and not HM. They flew to HM, FF, and GB at least twice a week for the day, only to fly back to have dinner with their families. My team, like many others, depended on planes as much as plans to work on the next generation of personal computers.

Over time, comments like *"I need to book a Shuttle"* lost their punch. I forgot this meant flying across state lines and not being driven to one of the other sites nearby. Oddly enough, no shuttle bus existed between local complexes. I accepted this movement as normal—flying up and down the West Coast for one's daily commute. The Shuttle highlighted the naturalized codes of this work: distributed, profitable, and global. I unfortunately never took The Shuttle, though I was assured by my boss, Katrine, it was less fun than it sounded.

The inside of Hampton Mills complemented the exterior; that is, it felt corporate. Each sub-building had roughly the same layout: large floors with head-high, bluish-gray cubicle walls. Some floors were in the process of being redesigned to be less claustrophobic. These floors had more open layouts with contemporary desks and frosted glass dividers. Some desks had a rotating array of transient employees who needed work space while visiting from a different site. Other desks were arranged like spokes of a

wagon wheel for teams to work together. My floor, HM3-3, had not yet received a makeover, nor had majority of floors in HM3 and HM.

HM3 was a grid of cubicles. Save the few areas that had different layouts amongst the cubicles, most employees seemed to prefer their isolated cubicles. I was told these cubes allowed employees to have privacy since a lot of LTC's work was sensitive. Even though all cubicles had three-and-a-half walls, some were further accessorized. Awnings dawned the tops of some cubes. Others sported a rope draped across the entrance. Out of curiosity, I often peered into these particular cubes to see what was so worth hiding behind a rope. Typically, there was nothing more than a bare workstation and a messy pile of vivisected personal computers.

All was not work however. As one might expect, many cubes contained images of wives, husbands, daughters, and sons; placards and diplomas; 8.5-by-11 inch print-outs of New Yorker comics related to computing; the occasional plant. I particularly liked cubes that displayed these personal artifacts on the exterior panel as if to say *I am more than a messy desk* while simultaneously abandoning these trappings on the inside.

At various junctures within the cubicle grid of HM3 were mirrored domes on the ceiling. These aided rushing employees from pouring coffee on their colleagues. Also in these corridors were posters. At the hour, the narrow veins and wider arteries of the grid rushed with employees as meetings transitioned. People flooded these alleyways at the hour, checked the domes for collisions, and ignored the smiling faces and finished products displayed on posters.

My boss, Katrine, and I sat amongst an industrial design team in HM3-3, near pole J/K. This area had a different layout. Katrine requested this location even though

these were not her/our direct colleagues. Years earlier, these industrial designers demanded to have no walls in order to do their work. As such—and the reason for Katrine's request—the space mimicked the trappings of a design studio. Within this 50ft-by-50ft area were unwalled desks, a meeting table, a few walls of pin-up space, a materials library, and the remains of prototypes and models from projects. This open square housed 8 industrial designers along with Katrine and I. We were user experience researchers on the Personal Computing Team (PCT); the industrial designers were spread across a variety of teams and projects, often on an as-needed basis. While the industrial design team asked each other about specifications and deadlines across their desks or compared shape-and-weight models of tablets at the meeting table, Katrine and I typed, listened in on remote meetings, and passed presentations of user studies back and forth via email. In other words, the space eased Katrine's discomfort with feeling caged more than serving a functional need for our work.

HM3 had a cafeteria located on the first floor. Employees referred to as the Café. Unlike the hush of the rest of the building, the Café buzzed with discussion. I frequently scheduled one-on-ones (individual meetings) in the Café; it offered a different mood. People seemed to let down their guard more frequently there, and the buzz of other conversations allowed one to speak above a hush.

These were not the only spaces. I had frequent meetings in many nearly indistinguishable meeting rooms. These long rectangular rooms all housed the same props: black rolling chairs; rectangular meeting tables that filled the rooms with approximately three feet on the long sides and six feet on the short sides; a projector and screen at the foot of the table; garbage and recycling bins located within hidden cabinets

at the back wall. The only distinguishing feature of these rooms was size. The size of the room was only really recognizable due to crowdedness. In some weekly meetings, I sat on the floor or on the counter above the trash in the back of the room when the group exceeded the capacity of the room.

In and amongst the many locked doors on these floors were rare studio spaces. These studios were referred to as "project rooms" since historically these rooms were given temporarily to teams working on critical, and often secretive, projects. These varied in layout, but had familiar trappings—whiteboards, sticky notes, and circular seating. In the spaces used by self-identified designers, a glowing Apple icon was common. The type of computers is notable since LTC worked prominently in the PC market, and all of the internal software—as it is in most business contexts—is designed for Windows operating systems. Using an Apple computer was burdensome at best.

LTC is not a design company (but design happens at LTC)

On the whole, HM contrasts the studio environments typically mentioned within design texts: airy layouts for frequent collaboration; ergonomic desks; pin-up space with mood boards and product samples; sticky notes everywhere. While my work area cultivated some of this image, it did so with a great deal of awkwardness. Removing the cubicle walls only occurred *within* this space. Bluish-gray fabric-covered walls still bounded my work area. Even more, while the walls were removed, the desks still remained positioned as if the walls were still up. All the desks faced the same direction rather than each other as one might expect within an open workspace.

The converted project rooms, likewise, were awkward attempts bringing the studio to LTC. The open layouts of these rooms contrasted the solid wooden doors (or

doors with blocked-out glass), window-less walls, and yellow lighting. With respect to this last issue, one team brought in their own lamps and bulbs. Granted I had no expectation that LTC would look like a bespoke design firm; the brick, mortar, and fabric cubes of LTC only confirmed this expectation. What I did expect was that within those rare designerly spaces would be where user experience work would happen. The studio as the site of UX design is a bias I brought with me into this site.

The monochromatic corporate trappings punctuated that LTC was not a design company in two significant ways. First, the bounding of these spaces highlighted that design happens at LTC, but maybe in limited ways. Like the industrial designers' open workspace, design is walled within the much more rigid world of LTC—the concentric grids of engineering, technology development, and global business. *Something-called-design* is not *the*, or even *a*, primary mode within these more dominant worlds and languages. To be clear, by *something-called-design* I mean the stylized performance of design—the sticky note clad walls; the vistas of renderings, models, and user stories; the often-bespectacled and well-dressed (e.g. wearing all black) people who call themselves designers. What was contained in that 50ft-by-50ft bastion of industrial design and various project rooms was an exception; it was *something-called-design* and used the languages and performances with which I was familiar. LTC was not a design company to the extent that LTC did not engage in *something-called-design*. The point is not that design did not occur at LTC—there were noticeable activities that feel like design—but that design at LTC did not look or sound like my expectations of design.

Those grids punctuated how LTC was not a design company in a different way too. Contemporary design texts codify the wall covered in sticky notes *as design*, at least

metaphorically. The metaphor is beyond that designers are brimming with ideas (e.g. notes scattered on walls). Design is playful and free-form, and adverse to established activities found within companies. Walls do not bound meeting space, but provide a means to be creative. For example, Tim Brown contrasts design thinking to typical corporate activities by using an example of a prototyped surgical tool created with a clothespin and a marker. (Brown 2008) This prototype both illustrates the accessibility of design thinking (a point Brown harps on), but also serves the rhetorical aim of being strikingly different than expectations. The prototype is not polished, nor is it a powerpoint. For Brown and his ilk (Verganti 2009; Utterback et al. 2006; Lockwood 2009), design is antithetical to established ways of doing things. As such, LTC failed *to be a design company* in that it did not invoke this homogenized image of design—say, *sticky-notes-as-design*, or something of the like.

Drawing from the literature review from Chapter 2, design can be understood as the process of generating proposals for products. These proposals are materialized illustrations—things, artifacts, and representations—that inquire, synthesize, and reflect on contemporary conditions. This description of design does not imply any particular aesthetic form for proposals. Depending on their use, the clothespin prototype and the powerpoint presentation could both be considered proposals (or not). However, *something-called-design* often *looks like something-called-design*. Even scholars like Elizabeth Goodman (E. S. Goodman 2013) and the collective A. Telier (Telier 2011) seem wedded to design *looking* a particular way as exemplified in the particular artifacts, things, and representations they choose to highlight. Due to this bias—my bias—when design happened at LTC, at first I missed it.

Designing did not look like design, and its subject did not look like user experience. I was looking for the *sticky-notes-as-design* version of design; the *user-stories-as-user-experience* version of user experience. Instead, design looked like arguments in cramped meeting rooms and thorough email threads explicating positions about important features. User experience looked like PowerPoint files being send via email to "*cover our ass*" as teams decided on features. User experience looked like my boss and I, as user experience researchers, deciding which clips to edit together to sway the decisions of upper management. LTC was not a design company because the practices that focus on planning, negotiating, and deciding on user experience at LTC—that is, the activities of design—occurred using a different set of materials, languages, and performances. Rather than washing over these differences, the present case study explores them.

Between the image of design and the activity of design is the work culture of LTC. I initially imagined user experience design would play itself out in limited ways—such as within and on the walls of studio space. I quickly realized my expectations were, as expectations are, partial. The gridded floors and closed meeting rooms were where user experience was not just presented but actively engaged too. I struggled to see these spaces as design spaces and the activities as designing. Designing was not isolated to the stylized, and thus recognizable (for me), performances and locales. The naturalized and subtle activities of designing were invisible at first. LTC might not be a design company, but LTC engaged in designing as a fundamental mode of work. Designing, however, was not necessarily the dominant mode of work, nor the primary mode of work. The problem was, and is, that the worlds described under the label design studies or human-computer

interaction often include sticky notes and pin-up space, mood boards and sketches. I came to LTC trained to see design in this way. What doing user experience looks like according to these texts was not what I saw. In a similar fashion, Bucciarelli describes struggling to observe engineering design, needing to reframe for what he was seeing. (Bucciarelli 1996) Between the expectation and what I came to see existed the work of user experience at LTC. The work of designing the user experience looked like designing, and other times it did not. These differences were a matter of presentation rather than activity. To reiterate, with design work as focus of this case study, the goal is to understand how a given environment shapes what is *design* work (what work activities constitutes designing?) and what is *design work* (what design activities constitute working?).

UX is a contested term at LTC

As has been mentioned and alluded to, user experience was a rather contested term within LTC. While the particulars of how UX was introduced are not discussed in detail until Chapter 6, these details are less important to how UX was perceived within the LTC on whole and within PCT as a smaller organization.

Andrew, an early-40s Product Marketing Engineer, was a member of PCT. As part of my field work on PCT, I sat down with most of the team members to talk about user experience—what it is, what one engages with in a role, and why it matters (or doesn't). For all the interviews, I started by asking about the interviewee's background. How long have you been here and what did you do before? Most of the team has been at LTC for a while, bouncing from group to group during re-organizations that were frequent within the computational technology industry. Andrew had been part of PCT for 4 years and at

LTC for 13 years in total. Prior to coming on with PCT to work on a new future-looking initiative called exemplar units (Chapter 5), Andrew worked in other marketing and operations roles at LTC. The longevity of many of the PCT team members careers was emblematic of the company's success in the personal computing market. As some of interviews touched on, the success of LTC in the personal computing market also led to stagnation. The recent shift in toward user experience, in this regard, was a reaction to a legacy of engineering-led thinking that was blamed by some for overly conservative decision-making.

Another indicator of this engineering legacy was Andrew's title: Product Marketing Engineer (PME). The role of PME had nothing to do with engineering explained Charles, another PME with a very similar profile to Andrew—an early 40s white male who had been at LTC for "close to 14 years" (Charles 10.22.2013) working in various marketing and operations roles. Charles commented that "sometimes we think they added *engineer* just so that you express that you're technical but you're not." (Charles 10.22.2013) Charles' statement offers insight into how LTC had imagined itself (that is, as an engineering company), how current employees related to this legacy (that is, with a "*well, sort of*" response), and how LTC wants to imagine itself (that is, as a user experience company). As a point of comparison, many recent hires who had been charged with user experience, such as Katrine (a user experience researcher), do not have engineer in their title. While the difference in titles may seem trivial and poetic, naming work and tasks was a pressing concern (Chapter 6). As user experience grew in importance and displaced aspects of engineering, the titles of jobs represented a swell in attention, and not always in a good way. A weary industrial designer, who at the time also

referred to himself as a "user experience strategist," (Brandon 10.24.2013) joked that employees might start referring to the custodial staff at LTC as "user experience janitors." (Brandon 10.24.2013)

While Charles laughed about his title and non-technical role, Andrew was clearly made uneasy by the position it left him in an engineering company trying to re-think itself as a user experience company. When asked *what user experience is?*, Andrew's response was telling.

Oh god [under breath] [...] I'm afraid to answer that question anymore because I've learned that when you answer it the wrong way with somebody who really knows user experience [gesturing to me] you can have it kind of driven right back down your throat. (Andrew 10.22.2013)

I assured Andrew that there was no wrong answer and he continued, stopping and starting as he considers his response. He explained that user experience deals with representing the user, "but I think of it in terms of my own job" (Andrew 10.22.2013) which requires different types of representations depending on the task at hand. After a pause, Andrew reflected:

User experience was something that was new to me when I...I...I'd probably say just before Katrine got here. LTC as a whole has historically had marketing folks very broadly focused on representing the, quote-unquote, customer. And that's meant a lot of different things. And what's happened with the user experience thing is that it redraws some of the boundaries of who's speaking for who. You've got, now all of a sudden, another added dimension of the customer that in addition to, you know, like I said, sometimes, a lot of times we have these multiple levels of customers to worry about. I'm finding now I'm much more focused on OEMs and much less focused on end-users as a result. Which in some ways is great, and in some other ways is not so great. Because I think in general the needs of the end-user can be a lot more interesting to work with than trying to figure out why some company likes one thing but doesn't like something else. (Andrew 10.22.2013)

Andrew's response offers two overlapping readings, which arise over and over again in meetings and interviews, and demonstrate how user experience was contested. The first reading is that Andrew was saying that user experience was an "added dimension," that is, something altogether new, to product development. The second reading is that Andrew was saying that user experience was encroaching on territory typically left to others, and, in his case, "marketing folks."

As an introduction to the study, Andrew represents a microcosm of many of the broader interactions and encounters witnessed during my stint at LTC. Unlike some foci, user experience had few clear cut boundaries. Andrew hesitated about the term out of fear of getting it wrong, which is a symptom less of Andrew's lack of understanding and more of Andrew's exposure to the variety of instantiations of this single term being debated (Chapter 5). Moreover, alongside the genuinely unique contributions of UX, UX also encroached on existing responsibilities, as in Andrew's case, or was foisted onto already over-extended employees (Chapter 6). Regardless, UX was far from a stable idea at LTC.

Another example of the instability of user experience came from Francine, a late-20s industrial designer. She explained that one of her first encounters with user experience was when she suddenly had the term in her title.

Yeah, to be honest, I don't really have a good grasp of user experience because the word's been tossed around so much [...] When I first applied for the job, it was industrial designer. And I noticed they put me up under a user experience designer, and I said 'Wait a minute! [...]' I mean I help in that process. [...] What the real difference between industrial designer and user experience designer is a blurred line. (Francine 10.24.2013)

Francine and Andrew, amongst many others, indicate a problem of specificity. User experience lacked clear cut boundaries—it was both something unique and well-worn; it overlapped marketing and industrial design, while also opposing engineering; it

was a by-product, an outcome, and an orientation. UX was contested and unstable, or, as Annemarie Mol might say, UX was multiple. (Mol 2002; de Laet and Mol 2000)

Compared to other roles and foci at LTC, user experience was unique in one fundamental way. Engineering practices, like mechanical engineering or board design, had defined objects of attention. Likewise, market research, strategic planning, and industrial design had territories which, at least at the present moment, seemed easily identifiable to others. User experience, at least at LTC, lacked such a clearly defined object of inquiry. The fluidity of user experience, whether perceived or actual, indicated a fundamental difference from these other domains.

After talking with Andrew for close to an hour, I sat down with Horace, also in PCT with a similar position though in his early-30s and from an engineering background. Horace fell into his position after arriving at LTC and realizing engineering, generally speaking, was less interesting than developing products based on contact with users. Working for a period on a team focused on emerging markets (largely markets in Asian and Africa), Horace spend a significant portion of his work in the field learning how people lived and bringing this knowledge back to his team as an intermediary. I asked if he considers himself a user experience professional, to which he said "I don't have any formal training in it, you know what I mean? It's just been [pause] I don't know: a lot of it is just commonsense." (Horace 10.22.2013) Horace explained a system he worked for a rural market. He spent a considerable amount of time talking about a fan his team added to blow dust out of the system. When he finished, I asked him the question that Andrew dreaded—What is user experience?

I think it's not complicated. I think it is what it says it is, right. What emotions or feelings does a user feel or express when they interact with

something. So it's, in our context, it's computing devices or PCs or whatever. [...] I think we, I think in general, people overcomplicate or overthink it's a lot deeper than what it is. It's not. (Horace 10.22.2013)

In the span of several hours of interviews, the same question was posed to different people with the similar or related roles in PCT. While some of these responses were similar, none were the same, and many completely contradicted one another. For Andrew, UX was complicated; for Horace, it was self-evident; for Francine, it was something she didn't do; for Brandon, it was exactly what he did; for Charles, it was a label like engineering. Now certainly these differences could be attributed to incompetence, and, for the moment, let's assume this was true. But, like an odd game of Clue, who was the incompetent employee? Was it Andrew with his dread and ignorance leading to a sloppy definition of user experience? Or, was it Horace with his commonsensical response and naivety smoothing off the edges of a more complicated idea? Or, maybe Francine with her inability to read the fine print of her job description? The truth is none of these readings are satisfactory.

Another way to understand these conflicting responses is that they were all correct because they were contesting the meaning of the term itself. For Andrew, a marketing professional, user experience research and design planted a stake firmly into his domain. UX carved out a space which had been his, but now he is seemingly unqualified to talk about it. In annexing his territory, Andrew struggled with negotiating these boundaries as he still was required to talk about them. For Horace, a user-centered convert, user experience was simple, at least from the perspective of what it is. His ultra-detailed account of adding LED lights and back-up batteries for power outages, fans for dust, and TV tuners to replace an existing device was only clear now, in retrospect. The point is

that UX had yet to be settled at LTC. UX was contested, negotiated, argued for and against. While scholars have a notion of what user experience should be, the present case study tracks the process of settling what user experience is in a particular context.

Here is your badge

The overview of LTC provides some background and grounding for the accounts that follow. While all of these ideas will be revisited in various ways, by way of concluding this chapter, I want to reiterate the main points.

First, LTC was deeply invested in the creation of computational systems. In co-evolving with the PC industry, LTC was structured around the main framing metaphor for how computational systems were made, namely, componentization. Componentization offered a powerful and orderly way of dividing up tasks, and while a retrospective history of the term presents it as clean and ordered, this interpretation comes with the distance of time. As much as growing pains currently surround UX design, componentization was mostly a contested idea that required significant reorganization. Over years, however, componentization was naturalized into the working rhythms of LTC. As we will see, user experience challenges the core of componentization—the discreteness of components. This challenge should not be taken lightly. Offering a way of working that is counter to componentization is ostensibly moving away from the legacy of LTC, the very make-up of the company itself, and the way LTC relates to its customers.

Second, LTC was not a typical space where one would find user experience design, at least from the perspective of scholarship about user experience and design. Beyond just the aestheticized version of design, LTC is a global corporation that does not engage with user experience design at a scale or scope that is described within much UX

scholarship. Coming to LTC with a bias toward seeing design in a certain way, or doing user experience with some explicit outcome, only clouds the observations of design work.

Lastly, user experience was not a simple object of attention at LTC. UX was contested on a daily basis in explicit and implicit ways. Employees in PCT were forced to have (or not have) conversations about user experience. While the contest played out in very explicit verbal ways, it more prominently played out in nonverbal ways. As was emphasized within the methodology chapter, practice offers a way to attune to this duality without separating one as real and the other as an expression. Practice focuses on the materiality of doings and sayings, and as such that materiality modulates. Sometimes these materialities even conflict with the intent of an activity. The contested nature of user experience makes it a ripe point of entry because its materialities reveal the shape of the debate at hand and reveal what is seemingly at issue (and what maybe should be).

The follow three chapters take on empirical accounts at LTC. They reflect on issues of temporality, professionalization, and decision-making as ways of unpacking the design work.

CHAPTER 5

NEGOTIATING UX

OR, DESIGNING HOLISMS AND WORKING WITH TIME AND RHYTHM

This chapter discusses user experience design within the context of a multi-disciplinary team working on a consumer electronics project. As is the case with all of LTC, UX design takes place in the non-studio setting of LTC in this account. While the project had a UX design team, UX design is discussed in terms of the activities of the whole project team rather than in terms of one individual perspective. The following account traces the ways the team negotiated user experience as a product and approach. These negotiations focused on both *what* the user experience was as a product and *how* UX, as a product, came to be made. These two entangled questions are explored through definitional differences, procedural changes to product development, and information discontinuities during work. The account focuses on differences in structural concepts of UX design with particular attention to the impact of these concepts on the time and rhythm of work.

A constitutive part of UX design is attending to the relationship amongst parts and wholes; this is a core competency of doing UX design. (Hassenzahl and Tractinsky 2006) The term *holism* (or the descriptor *holistic*) (Buxton 2007; Hassenzahl 2007; Hassenzahl 2008; E. L.-C. Law et al. 2009) summarizes this sensitivity and attention to part-whole relations within UX design. As much as the notion of holism communicates a conceptual relationship within the agenda of user experience design, holism does not determine the terms of this conceptual relationship in any practical way. In short, the notion of holism is underdetermined. Within the context of the subsequent account, the underdetermination

of holism led to different notions of how parts—teams, components, insights, deliverables, etc.—related to the whole—a prototype computing system made by project team. These different holisms had different expectations with regards to the time and rhythm of work. The different holisms implied different timelines for the *who*, *when*, and *how* of UX design. The problem of interest in this chapter is: *how did notions of relationality (i.e. holism) impact UX design work on the team?* The account points to a discrepancy between what counts as UX design work and what counts as mere execution or maintaining the vision of UX.

The focus of this exploration was summed up in an interview with Martin, the manager of PCT,

I think that [UX design] is most effective when the premise that you're testing is validating an idea or a belief that may already be held by management. I think it's much harder to move the needle when you're trying to postulate something that the management didn't previously buy into or outright thinks is incorrect. (Martin 10.23.2013)

In part, Martin expresses that when UX design aligns with established ideas of product development—that is, when UX design does not challenge norms (referred to by the effigy of management)—it can be successful. Martin is then making a paradoxical claim: UX design provides the most value when it does not offer anything new. However, what happens when UX design does not align with established modes of work?

Being in the context of LTC, engineering dominated the culture of product design and development. The observations took place within a project focused on building a bespoke computer for demonstration purposes. This project was more than an engineering problem. Founded on the premise of rethinking the future of personal computing, the project aligned with the strategic aspects of user experience design at

LTC. However, while the project aligned with a corporate strategy, the particular work activities required by some parts of UX design did not align with the expectations of many on the team. Moreover, the project had a user experience component, yet the bulk of the work (at least in terms of time) was engineering the system—that is, *realizing* the vision designed for the system. This intertwined relationship of design and engineering is certainly not new or exclusive to the context of LTC. Most, if not all, disciplines of design, from architecture (Loukissas 2012) to systems design (Bucciarelli 1996) to software design (Grinter 1995; Grinter 1997), depend on a parity of near eponymous engineering disciplines—structural engineering, systems engineering, and software engineering, for example. That being said, in much of the user experience scholarship discussed thus far, engineering is ancillary, implicitly taking a position of mere execution. Within the account, the two notions of holism implicate this notion of execution within UX design scholarship.

The subsequent account reflects on the contextual factors of user experience by tracing the tension between two notions of holism, and their distinction from the concept of componentization. These different notions demanded different sets of resources, tasks, activities, personnel, organizational structures, and working environments. While componentization had a rather well-understood definition at LTC (see Chapter 4), holism did not. Holism was new as a concept in many regards, especially with regards to working relationships. As such, holism was still being worked out in the activities of LTC and on the project team in question. Rather than assume the discrepancies in terms and activities are due to a lack of understanding, sloppy usage, or unskilled action with regards to UX, the present chapter explores how the different views of holism opposed

and embraced the existing resources, working relations, and goals of the team in practical activity. The goal is to expose the silent work (Gorb and Dumas 1987) of user experience design—work that did not count as design, though was vital.

The Exemplar Units Project

The exemplar units project was ambitious for LTC. The project began in 2011 with the charge of demonstrating a new generation of detachable laptops. Detachable laptops are a category of personal computing devices with a removable screen that can function as a tablet. The impulse behind the project was that detachable laptops were deeply limited in the current technological landscape. The detachable devices that were thin and light were ostensibly a tablet with a removable keyboard (rather than being a laptop with a removable screen) since they ran operating systems for tablets and often had compressed or low-travel²⁷ keyboards. (see Figure 4:A) Tablet operating systems lacked a full suite of compatible software, limiting productivity and requiring (at least in theory) people to still carry a full laptop. On the other hand, housing the entirety of a laptop within the screen made devices large and cumbersome, and defeated the claim that detachable devices were designed for mobility. (see Figure 4:B) Of the few hybrid devices that actually were a laptop and a tablet, their capabilities were limited when made thin and light enough to be mobile. (see Figure 4:C) These devices were the average of a tablet and laptop, and were rather average as a result. In this way, the detachable laptop was a rather unsatisfactory idea when materialized. While OEMs strived to create a new category of computers, the results fell into the existing categories and produced underwhelming results. Since much of the limitation stemmed from the ingredients

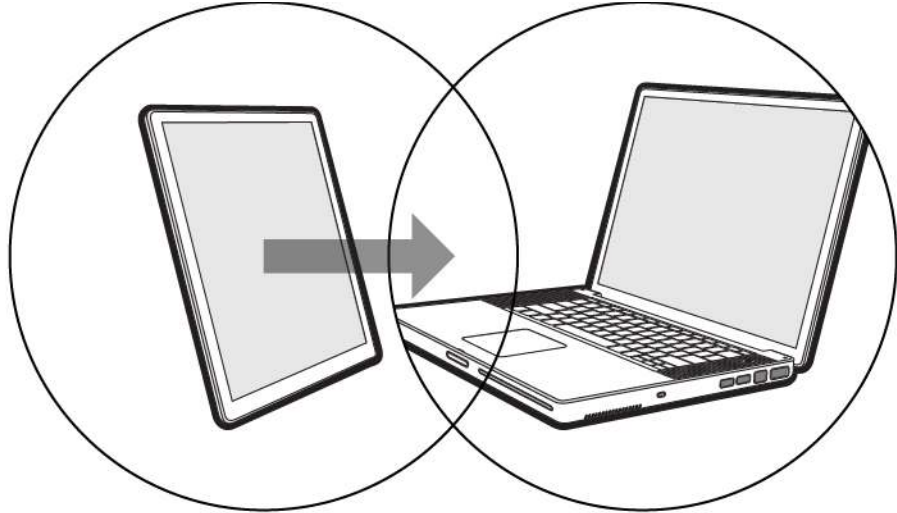
²⁷Compressed refers to the space between keys and the size of the keys on a keyboard. Low travel refers to the distance a key can be pressed down.

within the devices, LTC saw it as imperative to figure out how to fully realize a detachable system. The exemplar units project set out to build this next generation device.

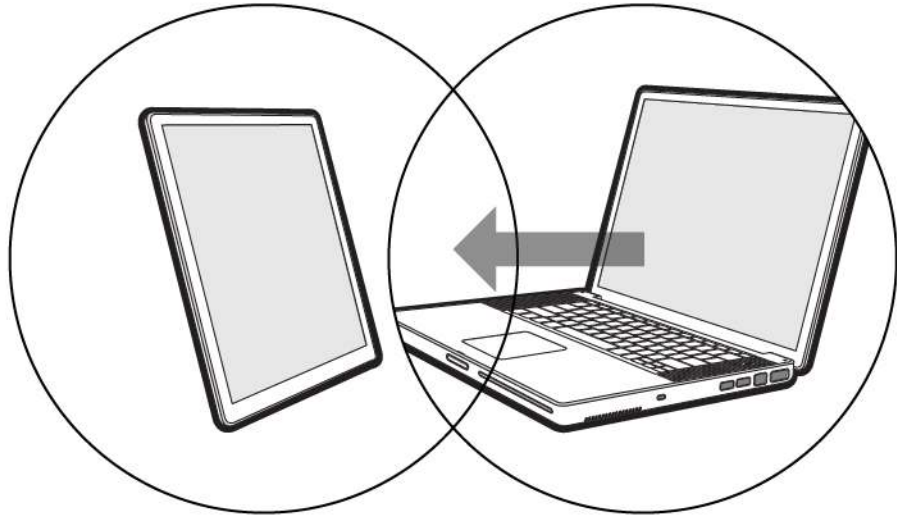
While the project, or at least this description, seems to focus on pure engineering (i.e. the ingredients needed to be smaller), LTC approached the detachable device differently. For years, and coinciding with the growth of computing market, LTC led the market in technical innovations, and these innovations seemed to be enough to give them an edge within the personal computing market. However, in recent years, personal computing began to compete seriously with mobile computing—smartphones, tablets, and the like. Steve, a social scientist who had been at LTC for over two decades, recalled a prophetic exchange that with a room of executives. He had returned from fieldwork in northern Europe in the mid-1990s and told the group about cellphones:

[I finished with,] "By the way, cellphones are going to compete with PCs." And everybody said, "No they're not." And then we said "Yes, they are!" And then [we all] actually went back and forth a couple of times before we [all] started laughing that this [was] silly. And [the executive team] said, "PCs are PCs, and phones are phones." [I responded,] "I understand that argument, but let's talk about SMS." And they were like, "What's that?" because they didn't know [about SMS] at the time. [I explained,] "It's these little text messages that you can send back and forth to each other. It's kind of like email. It's asynchronous. It's like email." [...] [The executives in the room said,] "Oh no, and email is something you do on PCs." [But we insisted that] phones are going to steal value from PCs, a little bit at a time." [Again, they said,] "No, they're not." Like really? They're not?! Yes, they are! But, we had no proof [beyond our observations]. We couldn't prove anything beyond [the limited fieldwork and our insights]. I couldn't. I couldn't do anything. All we could do is kind of keep watching. It got more and more painful because [people within LTC were] like "No, it's not. No, it's not. Oh! Yes, it is!" (Steve 05.09.2014)

A



B



C

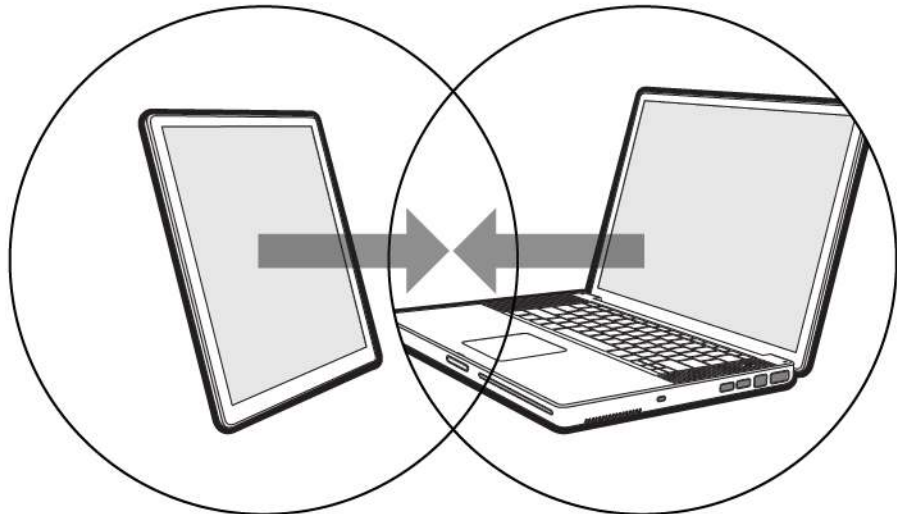


Figure 4: An unsatisfactory device landscape: a tablet with a keyboard (A); a laptop with a removable screen (B); or an average tablet and an average laptop (C)

As Steve recalled and as I was told in other accounts, the failure of LTC to recognize rise of mobile computing illustrated for the company as a whole, and especially the executive staff, that technological advances were not enough. Technological advances maintained existing product categories, and failed to attend to emerging needs that exceeded these categories. Engineering brought LTC to prominence, but could not predict how technology was going to be used outside of these seemingly stable categories.

Returning to the exemplar units project, as much as the project dealt with serious engineering tasks, the team was charged with grounding these engineering predictions in how a detachable device might be used. Scared of repeating what happened with mobile computing, the exemplar units project focused first-and-foremost on user experience. The goal was to engineer a system from the ground up with the whole in mind that challenged categorical assumptions. In particular, the project sought to challenge the either/or logic of existing detachable systems. The whole in this case was not just the system, but the system's use and the user's experience. Rather than assuming the fixed categories of laptop or tablet, or that a detachable was somewhere between these categories, the team began by envisioning an ideal device that fulfilled the needs and desires of a product that was *both* a tablet *and* laptop in a real sense. (see Figure 5)

An exemplar unit was not just a strategy

One way to think of the exemplar units project was as a strategy. The goal was to think through the upcoming generations of products, and what LTC might be missing. However, this strategy was material. The exemplar units project wanted to think through these ideas from use to engineering by actually building such a device. While the project speculated on the future use of detachable systems, they wanted to materialize such a

system, and not in a trivial way. From this perspective, another way to think of the exemplar units themselves was as the highest fidelity prototype of a detachable laptop imaginable.

The charge for the project team was to imagine how a consumer detachable laptop would be used, and the team set out to build such a device. The exemplar units were fully-working prototypes developed to demonstrate the future of personal computing. These computers, at their core, were more than just engineering feats. A similar project, called development units (or DUs), crammed as much emerging hardware and software into a single unit. These devices were test beds for developers to unearth issues with the processor, hard drive, various drivers, and enumerable other ingredients prior to the ingredients going to market. The DUs were essential to quality assurance and debugging components within a systems. As such, the DUs were built with a greater emphasis on technological advances and new components than the device as a whole. Often the DUs were the first time some components ever encountered other components.

Where the DUs often had a variety of (purposeful) kinks—CPU conflicts, interference amongst various antennae, and a "Frankenstein-ish" experience (Horace 10.22.2013)—the exemplar units were intended to be up to the standards of end-use products—seamless, slick, and, above all else, convincing as end-user products. The exemplar units focused on the selective integration of emerging hardware and software capabilities. While LTC made ingredients, the team focused a great deal of energy on innovative form factors for "targeting a specific consumer persona". (Horace 10.22.2013) Guiding the whole project, the devices were meant to demonstrate how the ingredients LTC made offered an innovative user experience.

One caveat was that the exemplar units would never be sold. In fact, only a few of these bespoke devices would ever be made. They required budgets in the millions of US dollars and cumulative work hours exceeding reasonable counts. They targeted hypothetical personae as end-users. They demanded partnerships with manufacturing and electronics companies. The devices were even put before focus groups. Here we need to return to how LTC makes money—they sell ingredients to OEMs who in turn manufacture systems with ODMs. The exemplar units were intended "to influence OEMs" (Charles 10.23.2013) for "platform enablement" (Mike 10.08.2013). The goal was to develop convincing prototypes to show OEMs and ODMs that these innovations were material innovations rather than speculations. As a material strategy, the exemplar units engaged in a critical technical practice of sorts. (Agre 1997)

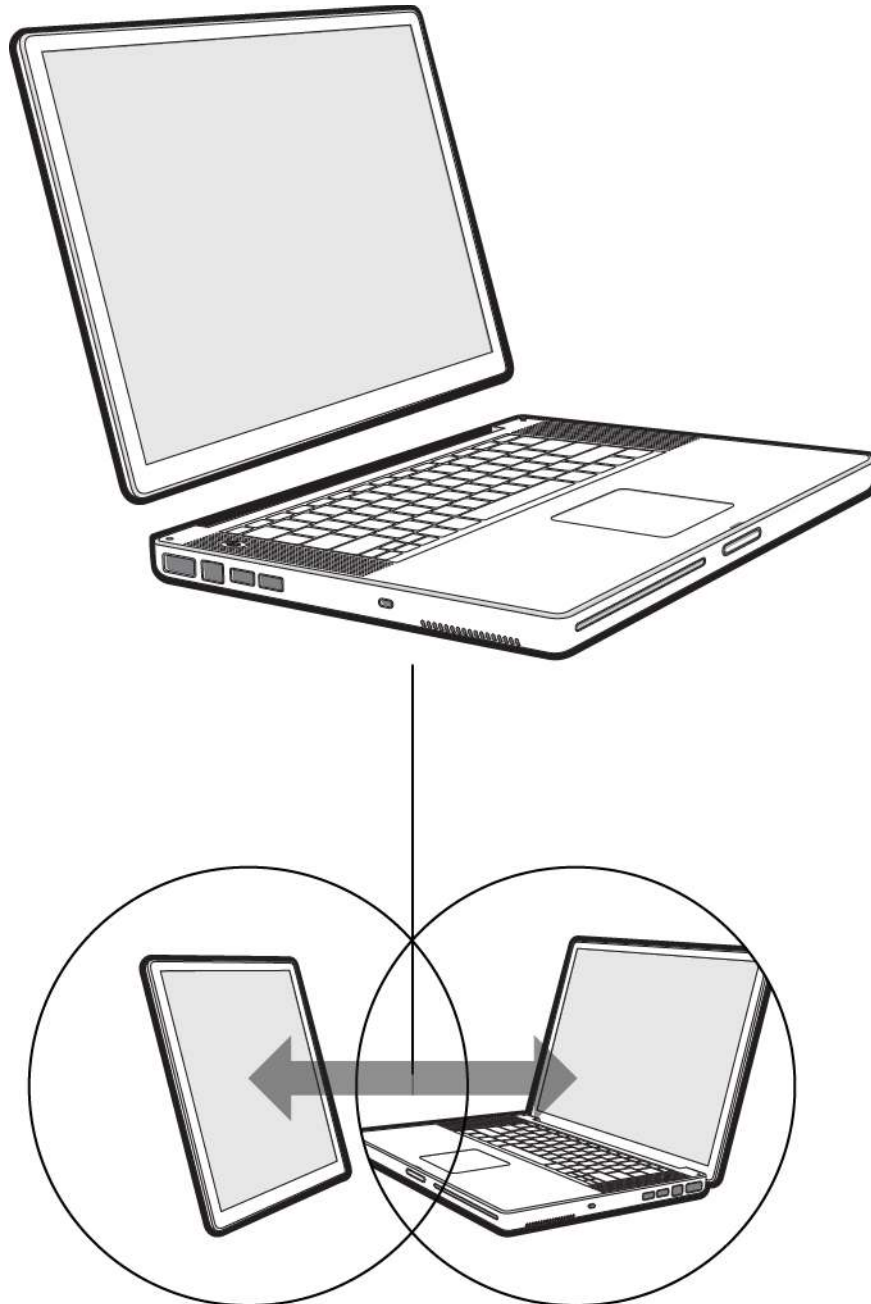


Figure 5: The exemplar units project sought to be an altogether new type of device that was both a tablet and a laptop rather than some approximation or average of the two types of devices

The exemplar units sought to untangle the web of how products were manufactured, if only slightly. The built devices sought two ends. First, LTC sought to convince OEMs that its ingredients could be combined to produce a cutting-edge user experience, and that this user experience was desirable to actual customers. By focusing

on user experience that was exclusively enabled by its ingredients, LTC wanted to guarantee its place within the future of personal computing. Second, LTC sought to convince ODMs that the engineering requirements for the exemplar units were possible by showing how they were done. By convincing OEMs of how ingredients get used and demonstrating that the devices OEMs were asking for were possible, LTC could reconfigure the power OEMs and ODMs had with regards to decision-making. Even more, by innovating particular manufacturing processes, such as how a screen is glued to the back panel or how a hinge moves, LTC would streamline the work for ODMs, who now needed to only scale-up already established processes.

Outside of this social web, making the exemplar units would be a great show of power, imagination, and innovation for LTC. These devices offered LTC the opportunity to shape the vision of personal computing from the backroom. Unlike cellphones, LTC wanted to remain on top of rising trends and reorient toward these trends.

What is Grim?

The particular exemplar unit that will be discussed in the subsequent account was called Grim. Grim was the second generation of the exemplar unit project. The first unit was called Fable. As the second generation, Grim is best understood in comparison to Fable. Both Fable and Grim had the same charge—realize the next generation of detachable laptop.

As much as Fable was innovative, it was rather unattractive and failed to meet its goal. First, the device relied on an inset hinge. Given all the components crammed within the screen—essentially the entirety of a full laptop—the inset hinge was the only way to balance the hefty screen. (see Figure 6) Combined with the full keyboard and trackpad,

the base had an inch-and-half wide extension that significantly increased the footprint of the machine (i.e. the space the device occupied on a desk). Second, the screen and the whole device were rather thick. The goal of the exemplar units project was to demonstrate that owning one device—a detachable—could support all the various activities of an individual. However, the thickness of Fable exceeded that of a thin laptop and tablet stacked on top of one another, and so failed to illustrate the point. Third, Fable used a variety of off-the-shelf components, and was ostensibly just an innovative form factor. While the device demonstrated a preliminary concept, it was more of a proof-of-concept that the teams could produce a device at all. Grim was to be different.

The goal for Grim was to realize the potential of the detachable laptop—thin, mobile, long-lasting, powerful, and truly both a tablet and a laptop. The team was determined to innovate in every way possible. The screen would be the thinnest tablet on the market, as well as run a full operating system. The tablet would also house a variety of sensors, such as biometric scanners and near field communication (NFC) arrays. When attached to the keyboard, Grim would offer variable functionality depending on the type of base/keyboard attached, such as an extended battery life. Grim would have a drastically reduced bezel so that the screen could extend closer to the edges. Grim would have both a large screen and a small footprint. Grim would require a unique hinge that balanced the device while adding no extra width or length. The list goes on: a variety of high-definition audio and video features, the latest processors and graphics cards, options for multiple operating systems, and so on. All of these aspects to Grim were never realized, however, as the exemplar units project was cancelled before Grim could be finished.

Of Components and Wholes

As has been explained, LTC historically worked in a componentized manner—LTC made independently operating components and the departments that made such components operated independently for all intents and purposes. The divisions of technical activities and organizations have been the subject of a variety of studies, from those related to empirical studies of the sociality of object-oriented programming (Grinter 1995; Grinter 1997; Herbsleb and Grinter 1999) to more general organizational studies literature (Miles and Scaringella 2012; Caspin-Wagner et al. 2013). In this regard, LTC compares to the many computational technology companies—departments and components were analogously divided, and this division was reflected in the overarching metaphor of what a computational system was. Like the components themselves, these various departments worked in parallel, sought out their own agenda (within the bounds of their organization's larger agenda), and assumed an insularity to their work. Componentization organized a computational system as much as the corporation.

The very concept of componentization has a drawback: the various components are often worked on in isolation, which led to potential problems when integrated into a system. Brian, a metrics researcher in R&D, explained the problem as follows:

[UX] becomes more important as you do these layers of integration from [deep hardware components] to software. At each of those stages, the user experience can break. And yet we are a company of people who sit in a corner and say "My little block works. I'm done." Right. So until you can get engineers talking about experience and experience researchers talking about engineering, you won't win any of those battles. (Brian 11.05.2013)

As this excerpt indicates, componentization had become insufficient. The isolation that componentization imparted on work also led to unsurprising problems of coordination. Components do not always work nicely with one another, and teams

working on components did not always work nicely with one another either. When put together, the integrated system can break down.

Brian claimed that in the past these breakdowns were thought of as technical problems, and so were remedied by making everything *work together*. However, components *working together* is more than a technical problem—it involves understanding the sociality of what *working together* means. On one hand, *working together* takes into consideration the user as a person, and so the user experience. If components *work together*, they can take on many different characteristics, some of which (maybe, most of which) are disruptive to the user experience. For example, if bluetooth interferes with wireless, adding a button to toggle between bluetooth or wireless may make the components *work together*, but it is maybe more annoying than the problem itself. *Working together*, in this respect, is a problem of UX design.

On the other hand, components *working together* means taking into consideration how teams might *work together*. Deliberately composing the character of use requires more than finding any solution to a technical hiccup, and finding this solution is somebody's work. Designing this character—that is, designing the user experience—requires the conscientious coordination of various components, which are represented in the work by their team members. Brian, then, problematizes componentization by highlighting the ways a user's experience stems from the deliberate and considered manner of making components work together, and the deliberation and consideration of teams working together. Like componentization, user experience extends in two directions—into the space of the designed product (e.g. the context of the user) and into the space of designing (e.g. into LTC).

In Brian's view, (doing) user experience design opposed the institution of componentization. User experience designing reworked to the old ways of doing technology development. According to Brian, user experience reformulated what it meant for components and teams to work together as a whole. The components of a system needed to technically accomplish their goal, but also do so in a particular way. The teams needed to make these components work together by recognizing that working together took work itself. *Working together* is a sociotechnical construct that is accomplished through work. User experience design, then, required conceptual and logistical orchestration. What this orchestration meant brings the history of LTC in conflict with its desire for change. The proven working efficiencies now conflicted with a contemporary mode of working.

The Holism(s) of UX

Breaking from componentization, another notion assumed prominence within the exemplar units project: holism. In an interview with Charles, the lead marketer for Grim, he explained the process of defining Grim. This definitional phase happened prior to my stint at LTC. At the beginning of the project, Charles explained that talking about technology or engineering was simply taboo. The core team wanted UX to be a precursor to all engineering and technology activity, including practical discussion of what components might be included. The reasons to place UX design before all other work were multiple, and included the incompleteness of Fable, the hope that user experience design would reveal new ideas, and the charter of the exemplar units project to be driven by UX insights. Charles explained that,

[There was] this fear that the engineers would design something that would preclude something awesome that we came up within UX. The fear

was very real, very tangible. And it slowed things way down. (Charles 10.22.2013)

Instead of the engineers doing what they normally do—working in parallel with a "few boundary conditions" (Charles 10.22.2013) on their components—they waited. UX disrupted work in trying to organize it. The team wanted components to coherently work together and so teams had to wait. In crafting the relationship amongst the various components in a holistic manner, UX design sequentialized tasks—first designing, then engineering. This design process included marketers (like Charles), those with the explicit title of UX designer, UX researchers, and a few select engineering leads. Though I did not witness this process firsthand, it was traceable in the Marketing Requirements Document (MRD).

During this design time, the plan for Grim was crafted and embodied in the Marketing Requirements Document (MRD). The MRD outlined the specifications for Grim at a high-level. The purpose of the MRD, in general, is to outline the project at this programmatic level—who is something for and why. In the case of Grim, the MRD read more like a story and included numerous pages on the hypothetical end-users, their daily life, and their needs. The document began with the market personas—their goals, their needs, and their desires. The full-bleed images showed crafty loft spaces with a bespectacled couple moving between work and leisure. The story that followed outlined the value proposition for Grim as a both/and device—both a laptop and a tablet, both mobile and powerful, both for work and for leisure, both light and high-performing. The MRD also included market specifications, including the need for an array of high-definition microphones, the desired form factor of a laptop with a detachable screen, and the price-point. These specifications, which typically constitute most of the document,

came near the end. The bulk of the MRD focused on Grim's value proposition, arguing that above all else Grim needed to combine the various features of a tablet and laptop.

Following the MRD, and still prior to engineering, the lead engineer created the Product Requirement Document (PRD). Where the MRD focuses on the needs of the project, the PRD, in general, commits to particular technical features that will be included. The PRD filled in the specific models of cameras, sensors, microchips, and other components. In the case of Grim, the PRD gave shape to what it is the MRD pointed to; the PRD was far from a blueprint though. While the PRD specifies particular components, it provides a "landing zone" for a project. Combined, the MRD and the PRD gave Grim shape, yet still did not determine all the facets of the device. At this point the detachable laptop was nothing more than two complementary documents, which offered a vision of components working together.

In reflecting on how the beginning of Grim took place, Charles reflected,

I think that that aversion to the old ways was so strong that it prevented us from finding any optimizations or parallels. And subsequently, if you talk to the engineering staff, they still feel like there is no patience at [LTC] for the UX way of things. There's no money allocated to do it that way. And we don't have the time or the schedules to do it that way. So, in the engineering orgs, there's a perception that UX is far too slow and can't keep up with the pace of technology. [...] I see this [as a] problem with really defining [what] the challenge will be. How do you define not only when does UX happen, but when's the right time, but [...] to figure out when it [...] co-evolves [with engineering]. How do the two exist together? And how do we avoid the problem of seeing them as mortal enemies? (Charles 10.22.2013)

For Grim, the shape that the MRD and PRD gave to the project focused exclusively on the device as a whole. The UX design process, which was composed of developing MRD and PRD, crafted a vision for Grim that needed to be executed. This is the first notion of holism—*the whole already built in mind*. This notion of holism was not

without its problems and was not the only notion of holism. This notion of holism required sequential activity and required a teams to wait until it was their turn.

A weekly meeting for Grim and "The Whole Already Built In Mind" is falling apart

The weekly meeting for Grim took place in a brightly lit and rather generic meeting room all-too-common in HM3. The meeting room held a single truncated oval table that filled the room and left a 3-foot path on either side for walking. Around the table were approximately 20 chairs crammed together. Everyone sat elbow-to-elbow. *Everyone*, as was and is too typical of technology companies, meant almost entirely men between the ages of 30 and 60, most of whom were wearing polos and slacks (some of these polos were even tucked into slacks). A few additional seats made a tight second row. Another handful of people were standing or sitting in the back of the room every week. This week, I was sitting on the floor with a clear view of the projected presentation. The only women in the room were Katrine, my boss and the lead user experience researcher for Grim, and Danielle, a market researcher for Grim.

When I arrived at LTC a month earlier, engineering for Grim had already begun. *Being engineered* meant that the teams were no longer brainstorming what would be built, and were instead trying to meet the requirements set forth in the MRD and PRD.

The weekly meetings for Grim were entirely based on a set of presentation slides projected at the front of the room. The presentation gave each discipline a single slide with the same format. The slide was divided into three columns. The middle column occupied half of the slide. Table filled this column. The table listed various expected deadlines for the particular discipline. For example, mechanical engineering listed the projected completion of a hinge design and when hinge prototypes would be

manufactured and returned for testing. The left column was composed of a list of various deliverables and their status. Deliverables that were completed or on-time were listed in green; deliverables that were behind schedule slightly or more complex than expected were listed in yellow; deliverables that were very far behind schedule or high-risk were listed in red. Green items were stacked above yellow items, and yellow above red. Two lists of dependencies filled the right column. The top list was composed of items that the team needed from another team, such as mechanical engineering needing the form factor designs from the industrial design team to integrate the hinge. The bottom list was composed of items that the team guaranteed another team, such as the system layout team needing to give the industrial design team the final z-height measurements. The lead for each team updated the slide from the previous week, and then the project lead for Grim cycled through the presentation. When the slide for a specific team was projected, the team lead explained the current status of their work.

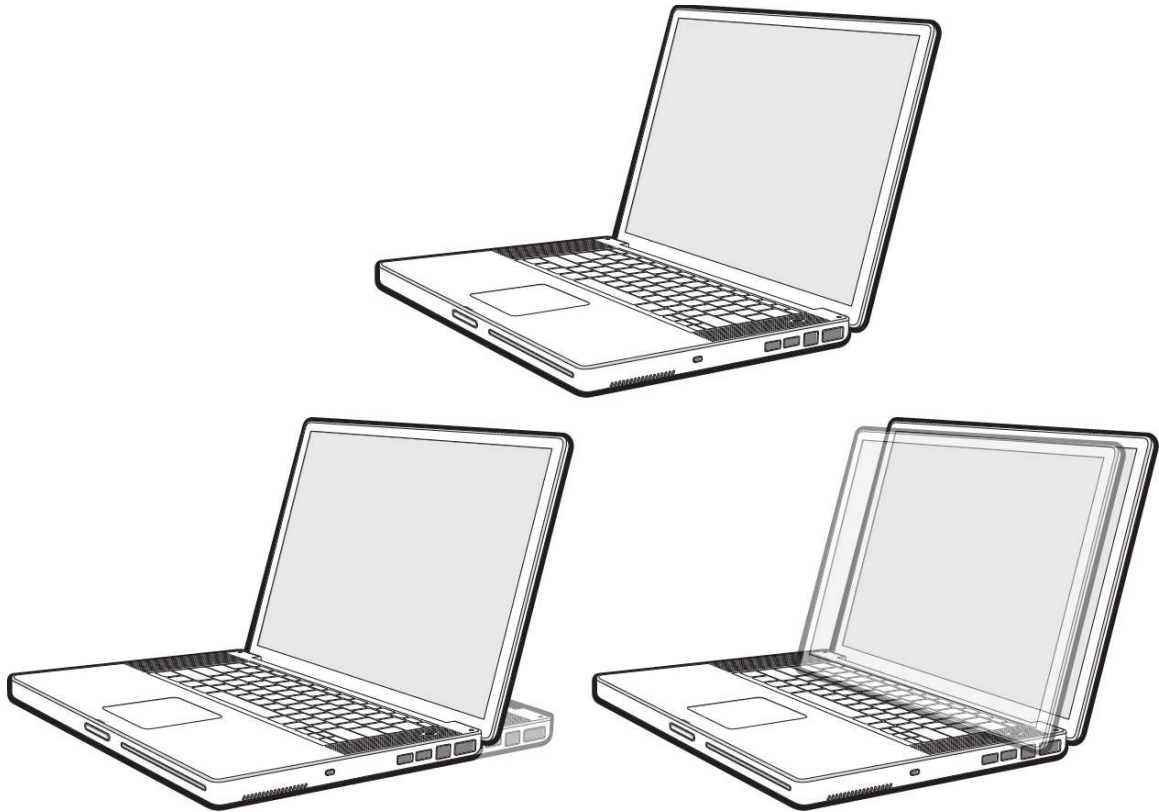


Figure 6: Exemplar units and exemplar hinges

As teams presented, the left columns were dominated by yellow and red items on this particular day. These were deliverables too high risk or too unfinished to guarantee their inclusion in Grim. These included a variety of things from a variety of teams (field notes, 07.17.2013, Grim meeting)

- The team in charge of the web camera explained that the model they intended to use from a third-party supplier was too thick. The camera increased the thickness of the laptop by 3mm. Reengineering the form factor with the mechanical engineering and industrial design teams was not feasible, let alone in direct conflict with the MRD and PRD. While the next generation of the camera would be thinner, it was unclear whether it would be available in time. The team decided

to use a different camera altogether, thus deviating from the planned high-definition video conferencing the device would allow.

- The audio team explained that the high-definition speaker array caused excess vibrations, leading to blurry optics and interference with the microphone array. Even more, with the change to the camera, the speakers and microphone seemed to be nominal inclusions.
- The software team explained that the speech recognition software they wanted to integrate was behind schedule. Instead, they decided to use the speech recognition software from Fable.
- The mechanical engineering team, who were excited only a week earlier about a hinge design, explained that the hinge they designed had a problem closing as well as a structural weakness. As a result, the hinge would need to be larger. As a result, the keyboard or trackpad had to shrink to accommodate the hinge. In either case, the keyboard and trackpad would need to be reintegrated. The larger hinge led to a secondary problem: it partially covered a logo that served as a home button when the screen was detached as a tablet.
- The industrial design team presented the other side of the mechanical engineering problem. The larger hinge resulted in an unsightly, partially exposed logo/home button. This button was located on the bottom bezel of the screen. When the screen was detached, the home button was centered in the bezel. When the screen was attached to the keyboard, the logo was split in half and the home button was inactive. There were a variety of options: move the home button up or down, or extend or shorten the portion of the hinge that covered it. In any case, the change

had implications for the current form factor (the industrial design team), the hinge design (the mechanical engineering team), the home button's position/functionality (the board layout team), and the branding of the product (the marketing team and third-party collaborators).

- The sensor team discovered that one of the antennas interfered with a sensor. The antenna needed to be moved or removed. In the former case, there were few options, including displacing a power button on the top of the screen. In the latter case, another core technology would be removed.
- On the user experience research slide were the results from the weekly focus group. Over the past 6 weeks, Katrine and I had run a weekly focus group to show people different form factors, color palettes, and materials. The UX research slide focused on receiving collaterals from various teams (mainly industrial design and mechanical engineering) to place before users. In addition to showing the results and asking for mock-ups, Katrine emphasized upcoming deadlines for evaluating Grim properly. To date, the focus group had only seen what Grim looked like and not how it worked. Without any prototype of the system, Katrine could not test the system.
- The user experience design slide differed from the other slides. Throughout the other slides, the director of the user experience for Grim, Hiram, insisted that the project team not deviate from the planned device. He cautioned that these changes would fundamentally change the user experience. On his slide, Hiram presented the next steps for presenting Grim to executives. While he asked for deliverables

and identified needs to evaluate the final system, Hiram's slide focused on a different task altogether.

Grim began with UX, and dissuaded discussions about engineering practicalities. Where engineering had long been in charge of the pace of development under the regime of componentization, UX design required all other disciplines to wait until the whole had been planned out. The fear of constraining decisions during the development of the MRD and PRD, design instituted cultural rules about what was and was not UX design work. Deciding on the vision *was* UX designing, while engineering and technology development was mere execution. Beyond just rules, user experience methods and insights constructed the MRD and influenced the PRD in concrete ways. Since the PRD determined what Grim was supposed to be, the PRD wrenched flexibility from the engineering team. The yellow and red lines on their slides were representative of the inability of teams to deliver on what the MRD and PRD outlined. Engineering was accordingly reduced to the role of execution—fulfilling the demands of the MRD and PRD, or failing to do so. Within this process there was no room for reworking the vision as outlined within these documents. *The whole already built in mind* meant UX design was done upfront in the sense that negotiations of what Grim was had already occurred.

Where the engineering teams lamented about lost time, they implicitly lamented the introduction of added bureaucracy. The sequentializing of work and the culture of fear led to inaction—teams did not know how to or, could not in some cases, respond to the requirements of the UX design. The grumbles about "doing the user experience" upfront were grumbles about the inflexibility of the Grim system as a *whole already built in mind*. User experience design set a guidepost, and then user experience designers

cautioned against transgression. The disdain the other teams expressed about user experience originated from the difference between what was planned and what needed to happen. The fissure between design and engineering, then, was also a divide between what was seen as creative and what was seen as rote or "vernacular". (Lawson 2005)

In spite of the missed deadlines, grumbles, and panicked teams, Grim was being built. Teams were engineering a detachable system and working toward a final product. With so many missed deadlines and risky bets, the requirements documents provided a poor representation of Grim. The user experience illustrated by the various images and stories in the MRD and the technical specifications in the PRD no longer corresponded to the user experience being made by Grim insofar as Grim had changed due to emerging issues. In other words, if the UX had been crafted within the requirements documents, yet the teams could not bring it into existence, *what* instead were they making? The device that resulted was Grim to a certain degree, but certainly not the same Grim.

A different kind of holism

On a different day with a different set of slides, the same problems arose, or, maybe more accurately, remained. Teams were missing deadlines and the project was deviating from the device outlined in the requirements documents. This week's meeting was referred to as a Map Day, where the extended exemplar unit project team was present and the meeting lasted close to 8 hours. Now in FF5, the room looked like a lecture hall from college, though without stadium seating. The neat rows were composed of unspoken cabals—mechanical engineers huddled in the back; UX designers took the front row; and other disciplinary territories existed amongst the 50 or so chairs. The goal of this meeting

was to figure out what Grim was going to be if not what was outlined in the requirements document. Sometime in the middle of the day the following exchange occurred:

Hiram [head UX designer]: Listen, if I give someone a prototype, that is a far better way to communicate what Grim is than a piece of paper like the MRD. Why? Because a prototype is integrated. The look and feel, and the user experience, they are all there. We don't need to talk about what Grim or Aesop [the proposed third-generation exemplar unit], or any device might be, because, well, it is.

Jack [system engineer]: Hold on, but what is it? I mean, what is Grim? We need to know what parts are a 'Go' [going to be included] and what parts are a 'No-Go' [not going to be included]. [Gestures at the spreadsheet being projected.] Those red lines. Are those No-Go's?

Katrine [UX researcher]: Go or No-Go?! We need something better than that. If a feature is a 'Go,' then it's a 'Go' under some parameters. [Gestures with hand, pointing at three points in the air.] It is a 'Go' under this, this, and this parameter.

Tripp [UX designer]: Sure, but I think those yellow and red items on the spreadsheet are shorthand.

Katrine: Shorthand for what? We need something more nuanced than yes, no, maybe. Look at the XCam software. It isn't like we just say it isn't going to be in there. The team has something, and it is better to have parts of the final product than nothing. We want Grim, at the very least, to resemble Grim.

Frank [software engineer for camera systems]: [Referring to the spreadsheet] Okay, so let's go through this. D-9 is 'complete software prototypes of XCam.' D-10 is 'validate prototypes against requirements for XCam.' D-11 is 'hand off XCam suite to XCam hardware.' XCam is in, but the old XCam, so D-10 is the problem. The new one is too big. So how do we decide what to include? Is anyone going to instruct us on how much we include? What are we validating against?

Rich [head software engineer]: Sure, this is the one big open question about the UX requirement in the MRD. We need a recommendations document as we move to engineering and things deviate. We need ways to act without destroying things.

Katrine: I am totally happy to sit down and go through the XCam or other parts with you. If you can get me things in time, I'll even get some feedback from a study. Essentially, I'll recommend three tiers once I have

a sense of the problem: ideal, acceptable, absolutely must avoid. Ideal meaning specifications according to the MRD/PRD. Acceptable meaning something close enough to the MRD/PRD that is reasonable in the timeline and won't break the experience. And, absolutely must avoid meaning, well, [laughs] just no matter, what don't do this.

(field notes, 07.18.2013, Grim Map Day, paraphrased)

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This exchange from Map Day counters the binaries that the previous meeting made fixed. Where the MRD and PRD outlined Grim, these documents left room for manipulation. The problem, as exemplified by Frank's plea for instruction, was that teams did not know how or where these trade-offs could be made. The teams lacked the ability to know how to deviate (i.e. lacked skill) and lacked the knowledge of the cascading effects on user experience (i.e. lacked information). Even more, the engineering teams did not want to be held responsible for deviating from the requirements documents and "destroying something." Katrine offered to walk various teams through a three-tiered evaluation, breaking down the various parts into more minute details. The following is from a meeting with the keyboard team:

***Alex:** We need to make decisions on the keyboard we will use.*

***Greg:** What we have defined so far is a full-sized, full-travel, full-pitch keyboard,²⁸ but that is about it. I mean that is ideal [i.e. in the MRD/PRD]. The problem is space.*

***Alex:** The problem is always space. If we keep the current keyboard specs, we may need to reduce the size of the trackpad. Is a small trackpad bad? Maybe we just get rid of the function keys.*

***Katrine:** First off, keep the 6th row. Users want the function keys—they use them. Reduced travel and reduced pitch are both pretty terrible for typing, but reduced travel is probably worse. It feels like you are typing on*

²⁸These terms are from ergonomics. 'Full-sized' refers to keyboard with all six rows of keys (one function row, one number row, three letter rows, and one control/spacebar row). 'Full-travel' refers to a classification of a keyboard that the keys can be depressed beyond a certain threshold. 'Full-pitch' refers to a classification of keyboards with the maximum allowable space between the centers of keys.

a toy. A half-pitch keyboard would be okay, but don't use the compressed keyboards. Avoid compressed keyboards for sure.

Charles: *Are we capturing this?*

Greg: *Yep. [Gestures to his laptop.] Maybe we should project? [Fumbles with display connector. Spreadsheet appears on the screen.] I guess we should have a column that has what Grim actually has.*

Katrine: *In what way? What is outlined in the MRD/PRD?*

Greg: *Yeah.*

Katrine: *That's what ideal should be. We don't want to exceed the MRD/PRD.*

Alex: *I doubt we will.*

(field notes, 07.24.2013, Grim keyboard recommendation meeting, paraphrased)

In the exchange from Map Day and from the keyboard recommendation meeting another notion of holism arose—*building with the whole in mind*. Responding to the request from Frank and Rich, Katrine offered to help navigate the requirements documents. The engineering teams felt the documents overdetermined what Grim was, exemplified in Rich's comment about trying to avoid "destroying things." However, to the best of my knowledge, while the MRD was an altogether different document, the PRD was a fairly standard instantiation of specifications. As such, the various teams should have been accustomed to making changes based on engineering concerns while still adhering to the PRD. The problem with the requirements documents was that they were illegible with regards to user experience as a product. While the PRD challenged teams to include cutting-edge technology, the technology itself was not the issue. Instead, the issue was understanding the relation of parts to the whole, i.e. user experience as a product. In

other words, while UX design was unfamiliar to the teams, they were also unfamiliar with working together to decide what was or was not important, i.e. user experience design as work. This work—the work of working together—fell on the shoulders of Katrine.

This second concept of holism embodied more than the composition of parts to a whole within the device Grim. *Building with the whole in mind* required teams to consider the implications of what they changed. These implications could not be solved on their own—that is, within a single team—but required teams to find ways to communicate what the trade-offs might be. Reasonably, teams might be able to do this on their own, calling meetings with other teams to discuss. However, these meetings did not happen, and Katrine served as a go-between. By sitting with the various teams (in the end she only met with three teams as the project was cancelled shortly after the keyboard meeting), she embodied the work of working together. As much as her recommendations came from years of user studies and were informed by a wealth of design judgement, her major contribution was modeling how teams needed to work together. Rather than simply let the keyboard team know what was ideal, acceptable, and damaging via email, Katrine modeled the process.

Discussion: Between Work and Working Together

Whose profession is this, anyway? Nobody's and everybody's. We are all in it together, we all need one another. (Donald Norman 2015)



For Grim, integrating user experience into technology development and engineering meant negotiating conflicting relationships amongst parts, disciplines, and activities. UX design entered into the long-standing culture of componentization. LTC

thrived within the working efficiencies of componentization that became embodied in the organizational expectations of work. Under the regime of componentization, teams needed to complete their part to specifications, leaving integration as a purely technical task. In contrast to componentization, UX design introduced the notion of holism, which required components to be related to one another.

As a concept and term, holism has a prominent place within UX scholarship. The definitions from scholarship provide a point of comparison to the account. First, like the account of Grim, holism means different things within and across these contexts, and is far from a uniform idea. Most prevalent within academic writing is the term *holistic* (Battarbee and Koskinen 2005; Hassenzahl and Tractinsky 2006; Wright and McCarthy 2008) that refers to user experience as the "multifaceted impression an end-user has of an interaction/encounter." (Kaye et al. 2011) Holism means both irreducible and contextual. By irreducible, authors mean that the user experience cannot be reduced to any single part of use and exposure to a device; experience accumulates. (Forlizzi and Ford 2000; Forlizzi and Battarbee 2004) By contextual, authors mean that user experience depends on the environment; experience is situated. UX design accounts for the many subjective, temporal, and situated aspects of using a device, and proposes ways to support these accumulated and located experiences through a product's design. Even more, holism is used to communicate that the relation of a device, subjectivities, and contexts exceeds the immediate use of a product.

This first concept of holism contrasts "reductive" (E. L.-C. Law et al. 2007) theories of UX. Reduction, as Law et al. explain, simplifies and operationalizes experience for the explicit purposes of product development. Reduction is, then, a way of

theorizing experience within UX as constructed from a localized envelope of activity and engagement. Experience corresponds to a product within a field of parts that can be exchanged, replaced, or equivocated. This correspondent relationship makes user experience transmutable, changeable, and reducible to its parts. In turn, these parts when composed in a product produce the user experience. The larger situation of use—what might be called the context—are relatively inconsequential.

A second way to understand the term holism within this literature relates to user experience as a set of intertwined work activities. For example, Gegner, Runonen, and Keinonen compare user experience to usability engineering in order to show this difference. They write,

Usability engineering can be considered as a function within product development that can operate in parallel to other product development processes. UX [...] requires an even more holistic approach combining the various organizational functions in order to achieve a compelling user experience. This aspect of UX is, therefore, more related to innovation management. The functions differing greatly from traditional usability engineering include marketing, strategy, and design. (Gegner, Runonen, and Keinonen 2011)

For these authors, holistic refers to more than the theorization of user experience as the interrelation of a variety of disciplines that share a collective vision of the outcome and understand their contribution to it. (D. A. Norman 1998; Donald Norman 2015)

Holism, in this second way, refers to the processes through which user experience design is done—the necessary interdependence of a variety of teams and the irreducibility of the work to any one team. User experience must be orchestrated. This second use of holism points to user experience as a set of dependent work activities as much as dependent aspects of a final product. These activities integrate and compose the parts of the product development process through a common thread, namely a user's experience.

These definitions of holism from scholarship provide points of comparison to the exemplar units project. While some on the Grim team interpreted holism to mean indelible, objective, and unchangeable, others interpreted holism to mean relational, situated, and responsive. These two ideas of holism required different arrangements, and changed the temporal rhythms and timelines of work. On one side, some asserting holism was synonymous with indelibility. This idea of holism isolated control over UX design to those involved in the initial planning phase for Grim. In such a view, UX design came before all other work. As problems arose during development, this view offered no means for flexibility—*the whole was already built in mind*. In particular, the lack of flexibility made the MRD and PRD into rigid guidelines for engineering. As such, engineering and all other design tasks (such as industrial design) were left to execution upon the plan within these documents. By serializing design and development of Grim, the engineering teams did not know how to respond to the changing conditions. The MRD and PRD failed to accommodate changes to the components. This indelible and completed holism defined holistic UX as done by those called designers. In this way, the (perceived) inflexibility of user experience as a holism—in this circumstance, best understood as a prescription or a plan—not only devalued the work of the other teams, but unnecessarily constrained them through either cautions against deviation or abandonment of directions and alternatives. The actions that must be taken to produce Grim were bounded by circumstances, resources, and activities that could be produced by virtue of their prescription.

In the latter stages of Grim a different type of holism emerged. This concept of holism focused relational, situated, and responsive strategies to construct a whole. This

concept of holism functioned more in the vein of componentization. While user experience seemingly bounded decisions and activities, relational holism opened up the possibility for alternatives. The whole in this case was constructed of parts rather than constructed as a whole. This distributed and flexible holism defines holistic UX as *building with the whole in mind*. Unlike the complaint that all the *little blocks* (Brian 11.05.2013) worked on in isolation but not together, UX design that embraced a relational holism started with relationality as the operating premise. The MRD and PRD outlined a device that could not be built, but also outlined an experience that could, at the very least, be synthesized and approximated. In translating the user experience to the various teams as three-tiered paths, Katrine distributed responsibility over UX design to those teams. Teams were given tools to understand the dependence of their component to the overall perception of the system, and so were able to be held accountable to their role in the whole system.

The striking difference between the mentions of holism in the scholarship of UX design and the accounts of Grim is that the former focuses largely on how holism is conceptualized at design-time (prior to development), while the latter accounts focus on how the holism conceptualized at design-time functions at development time. This latter conceptual field related to holism questions the clean divide between design and development. What are the temporal rhythms of design and development? In one notion of holism from the account, design and development are ordered sequentially. Design occurs, then development occurs. This conceptualization leaves no room to design at development time. In the second notion of holism from the account, design and

development are ordered, but iterative. Design continues to occur during development as the user experience is refined.

The time and rhythm of designing also reveals the inbred power relations of asserting something is design. To design, at least in the eyes of the Grim team, meant to shape the project and have a say in the final outcome. Executing offered no room for deviation, and stripped teams of the ability to do their work as they saw fit. In the scholarship about user experience design, the power relations of doing user experience design are largely absent. While designing is mentioned, the focus of this work and theorizing is on holism within design processes rather than holism as it understood by teams developing a product. Genger, Runonen, and Keinonen, for example, mention that many disciplines are gathered under the umbrella of UX design, yet do not explain how these various disciplines contribute to designing or developing the user experience. (Gegner, Runonen, and Keinonen 2011) Another example is Forlizzi and Battarbee's proposal for a framework to conceptualize experience. They write,

Multidisciplinary design teams can use the framework to understand and generate kinds of interactions and experiences that new product and system designs might offer. Once a set of user-product interactions and experiences has been generated, research can be conducted to better understand the people, contexts, and activities to provide solutions for the design problem. (Forlizzi and Battarbee 2004)

Again, the focus in this scholarship assumes that the various roles of design and development are accepted and fixed. In the case of Grim, where UX design was new, working together was work that still needed to occur. Design scholar Donald Norman provides a useful reflection that is strikingly similar to the account of Grim:

[B]y the time the product is shipped it has been completely distorted. “Can you help us stop companies from ruining the design?” designers ask. This question points out the fundamental flaw in understanding the role of

design. Design cannot be separated from the other considerations of a product. The person who 'ruined' the design probably was trying to improve some other dimension of the product. The design must have been unsatisfactory in some way. This happens when the industrial design team's work is completely without consideration of all the relevant variables and then the team is frozen out of the final decision process. [...] All design is a series of tradeoffs. (Donald Norman 2003)

The initial goal of introducing user experience was to have teams rethink the types of products LTC made. User experience, in return, forced teams to rethink how they made products. The discrepancies between what was meant by holism highlighted how user experience reflects its setting, and that the conceptual field user experience leaves a great deal of interpretation for the work of user experience.

Within user experience scholarship, this inattention to the working context of UX design is often overlooked as a different problem altogether. For example, Marc Hassenzahl laments that while there are many shared notions "subsumed under the umbrella of User Experience (UX)" across academic and professional contexts, "a widely accepted, shared understanding of UX is still lacking" (Hassenzahl 2008). These shared notions, according to Hassenzahl, do not mend "the wide gap between practitioners and academics in their understanding of what UX actually is." Hassenzahl sees the differences between academic and professional settings as a matter of finding a shared language to discuss user experience.

Underlying this thread of UX scholarship (Hassenzahl and Tractinsky 2006; E. L.-C. Law et al. 2007; E. Law, Roto, and Vermeeren 2008; E. L.-C. Law et al. 2009) rests an assumption similar to that of Hassenzahl—the differences between academic and professional user experience is definitional. The multiplicity that plagues user experience can be attributed to the lack of comprehension of the core agenda of user experience.

These misunderstandings stem from definitions that are either too rigid or too vast. In either case, the relationship amongst the user, the product, and the environment fails to be appropriately captured. Accordingly, the proliferation of meanings for user experience is a problem solved through unification.

Unifying frameworks vary in approach. Some frameworks focus on experiences as the units of analysis and design (Forlizzi and Battarbee 2004; Forlizzi and Ford 2000; Zimmerman, Forlizzi, and Koskinen 2009). By defining these base units, practitioners can more easily attend to the differing context of users. Other frameworks normalize existing definitions (Swallow, Blythe, and Wright 2005; E. L.-C. Law et al. 2007). These frameworks strive to build a ground-up understanding of what ideas constitute good user experience, and so seek to dampen extraneous or idiosyncratic considerations. Other frameworks build analogs from existing approaches (Hassenzahl and Tractinsky 2006; Hassenzahl 2008; Pucillo and Cascini 2013). By building on established fields, these frameworks provide a way for practitioners to establish best known methods. These unifying frameworks treat the divide between academic and professional user experience as fixable conceptual rifts.

The divide between academic and professional settings, however, is relic of deeply under-theorized notions of designing. In other words, the divide between academic and professional user experience design is arbitrary. The differences, as Grim highlights, are the cultural norms related to multidisciplinary development teams. In short, while academic scholarship theorizes UX design and sometimes implements UX design, the accounts of UX design do not include the subsequent UX development phase. In this phase, as this chapter has argued, terminology means different things. Without

adequate accounting for the way designing continues during development, design scholarship is only partially theorizing design work.

CHAPTER 6

STANDARDIZING UX

OR, DIFFERENTIATING (WITH) UX DESIGN WORK

Design has become too important to be left to designers. (Brown 2009)

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The epigraph for this chapter comes from Tim Brown, current CEO of the prominent design consultancy IDEO. Troubling about Brown's statement (and other statements like it) is how it can be interpreted. When design is no longer left to designers, who is in charge of what good design(ing) is? This chapter explores this sentiment in Brown's statement more closely through an empirical account. The account follows the development of an advisory council for user experience within PCT. In short, the Council became necessary as UX design was no longer being left to designers. The account focuses on the Council in order to explore the relationship between professional work activities and institutional mechanisms that underlie strategic design initiatives.

Much of the writing around strategic design initiatives emphasizes the mindset of designing. (Brown 2009; Lockwood 2009; Verganti 2009; Nussbaum 2013) From problem-setting to prototyping, this designerly mindset can be applied to the strategic direction of a company rather than just its products. To do so, as Brown alludes, designerly approaches must permeate a company in order for these activities to unlock the latent creativity of employees and lead to innovation. These initiatives assume that the infrequency of true innovation stems from insufficient creativity (this will be critiqued more thoroughly in the Chapter 8). As such, the merits of strategic design initiatives are

self-evident according to this logic—when designing creatively reimagines what a company does or makes, it leads that company to innovative outcomes.

Another issue arises from demanding that everyone adopts a designerly mindset and uses design methods—they will. Certainly engaging with these methods or mindset is not inherently problematic; the claim is not that all designing should be done in a certain way (at the very least, there are too many disciplines of design to consider this a possibility). Instead, from the practice perspective and in particular, doing UX design must have rules in order to know if one is doing it well or poorly. For a company invested in a new set of activities, well or poorly is a matter of return on investment. Then, how *do* employees align both their activities and their insights with the company? At the company scale, the issue requires institutional mechanisms of coordination—how does a company align insights and innovations at different scales to create a coherent strategic direction?—and standardization—how does a company ensure the insights and innovations at different scales are being conceived of in systematic ways? This chapter looks at the work related to the second concern: standardization.

The chapter explores how the process of institutionalization became a process of self-effacement, or making the strategic design initiative invisible and commonsensical. At LTC, doing UX design well or poorly became a matter of making UX design work into *just work*. Erasing the strategy altogether (or, at least trying to) became the unspoken strategy for institutionalizing it. The goal of the Council was to make user experience design transition from being *a way to do things* to *the way things are done* by removing alternative modes of product development. Within the climate of LTC, self-effacement solved two problems—resistance to UX design and nominal UX design. The chapter

argues the Council, and its role in distributing UX design work, exposes a fundamental issue related to professionalization when distributing design. While an effective approach, the Council replaced professionalization with institutionalization.

The ATSIR

The Annual Technology, Society, and Industry Report (ATSIR, pronounced "At Sir") is a yearly report that explores and assesses what LTC has been doing and what it ought to do. The report is rigorous, examining a few selected areas of interest and recommending changes or new directions to these areas. The report guides executives, managers, and employees on how to align their work to the direction of the company. While some of the ATSIR focuses outward on emerging trends within the industry and pressing issues with regards to LTC, the ATSIR also focuses inward on a few already established areas of the company each year. The inward focus is broad (that is, not public evaluation of a group's performance), such as a study of certain product segment or the effectiveness of a particular benchmark across several internal organizations. When the ATSIR revisits these internal foci, the goal is to redirect work through comparison to the industry and the company's current strategic direction. In this way, the ATSIR is a document to both introduce new ideas and to evaluate more established activities at LTC. The User Experience Council ("the Council") was proposed in the 2013 ATSIR.

My boss, Katrine, explained that being selected to participate in producing a section of the ATSIR is taken very seriously. Since the report has the potential to change the research and business agenda dramatically, the process was extensive, systematic, and very secretive. The inclusion of emerging trends implied possible shifts away from older trends. Reviews of existing initiatives or activities could signal an impending

reorganization of personnel, resources, and projects. New markets might require the consolidation of working sites or the creation of a new one. The ATSIR impacted budgets, management, and corporate vision. In recent years, the ATSIR even contributed to changing the marketing slogan for LTC (and then changing it again). Whether the report revealed activities are running below or above expectations, those organizations mentioned within the report (and the employees therein) will change in some way. In whatever case, the ATSIR was more than a report card. The seriousness of the ATSIR was rather clear. Employees often referenced the report in the way that the phrase "a recent study showed" is used in news reports to mean "despite what you think, here's the truth."²⁹

Over the years, the ATSIR had focused on topics now well established within LTC: the rise of smartphone and tablet technologies, various advances in supercomputing, and findings from emerging markets research. All of these ideas led to significant changes, such as the establishment of the Mobile Computing Team (MCT) and the now-defunct Emerging Technology and Markets Team (ETMT). In 2006, the ATSIR included a section on user experience. This was the "first time" user experience was introduced at LTC. (Brian 11.05.2013) The 2006 ATSIR reported on the ways social science research, and largely anthropology, was being used within technology development. The ATSIR recommended a deeper integration of social scientists into the business groups and research labs. The 2006 ATSIR led to the creation of the Lab for Experience Research (LER) and opened up positions within business groups such as the

²⁹It should be noted that the ATSIR had impact, but the extent of that impact was different in different organizations of LTC and differently perceived by different groups. Within the context of my research, the ATSIR was an often-mentioned document. The perception of the ATSIR as impactful to LTC on the whole was precisely that, a perception. This perception was one communicated through my observations and interviews. The actual acceptance of the ATSIR throughout the company is hard to know, and most likely variegated.

one Katrine now held with PCT as a user experience researcher (she was originally brought in as part of the LER).

The 2013 ATSIR returned to user experience, less to track how the recommendations implemented from the 2006 report and more to understand the more recent fever pitch of UX at LTC. The 2013 ATSIR focused on how well LTC had institutionalized user experience, from cultural norms to organizational structures. They compared best practices with an extensive survey of internal teams and organizations. While simply having employees using the term *user experience* was important, executives and employees alike were unclear whether the fervor around user experience was a productive climate.

Brian, an R&D metrics researcher and a core member of the 2013 ATSIR, explained that LTC was rather unsystematic about introducing the concept in recent years. In 2006, the term *user experience* had very little traction since it was new. For the first few years, the locus of the efforts labeled user experience was within the LER, where a variety of social scientists researched and demonstrated the value of a UX approach to research. As individuals from the LER branched out into other research and business groups, user experience gained visibility and traction within the product groups. In the last three years, however, user experience implementation became a priority when the then-Chief Technology Officer of LTC announced in 2010 that performance and engineering prowess "wasn't enough these days." (LTC Press Release, 06.30.2010) LTC needed new ways to approach making computational technology ingredients. This announcement came at LTC's 2010 annual conference at which it typically debuted the next generation component or emerging prototypes. Accompanying the CTO on stage in

2010 was the head of LER, a trained anthropologist, who explained that the future of computing would be shaped by observing people and not making parts smaller.

Unsurprisingly, this announcement was accompanied by a great deal of urgency.³⁰ Teams scrambled to comply. With little to no experience and no previous operating standards, teams had few checks on what was meant by user experience and how one engaged in designing it. Teams, at the very least, wanted to show that they were able to work in this new way—observant of people and attentive to the needs of users. Without a way to compare what was being done in the name of user experience with one another, Brian began observing troubling issues:

If I'm going to be frank, everyone and their dog wants to own something around user experience since it became user experience. We have people that are [in] power and performance, [...] validation, [... and] software engineers, all calling themselves user experience researchers now. I would say 20 percent or 30 percent of my day is spent chasing down and trying to prevent people who shouldn't be doing user experience research from doing user experience research. (Brian 11.05.2013)

Brian explained that the urgency to comply combined with a lack of professional standards and nascent managerial knowledge for UX led to a deeply varied set of activities. As the previous chapter highlights, a multiplicity in meanings and activities is not a problem inherently, but arises as a problem when they stem from differing agendas that impede one another. That being said, the multiplicity of the concept of user experience is not the same as the nominal interpretation of it.

Steve contextualized Brian's comment months later. Steve, a veteran social science researcher with training in human factors engineering, explained that in the late

³⁰This urgency was communicated to me through my observations and interviews. The concern is not whether activities were urgent or manufactured as urgent, but that they were recounted to me as urgent. The goal is not to come to some objective ground truth within this case study. Instead the goal is to account for the various experiences of employees at LTC and how those perceptions developed within the culture of LTC.

1980s LTC began realizing the need for human factors engineers. As computing moved from highly specialized technical fields to broader enterprise systems and personal settings, usability became vital. The assumptions of who used a computer (and what they did) changed when the computer became a black-boxed tool. Executives at LTC realized that their engineering prowess mattered less to consumer electronics companies if LTC could not design and development components with use in mind. As a result, LTC hired several human factors engineers.³¹ These new hires were nowhere near enough given the size of the company and the demand to have the input of human factors engineers across most, if not all, groups. Instead, Steve explained, managers and executives "just appointed people. 'You are now a usability person.'" (Steve 05.19.2014) He continued,

People just saying 'I'm just a UX person,' right, is a pattern that has not been unseen at [LTC] in the past. This is not an unseen pattern. This has been happening [...] Now the lesson that we failed to learn apparently is that this whole little model of appointing people, like usability people, is terrible.

This pattern of appointment underlies the 2013 ATSIR, yet does not explain why individuals at LTC, whether those are appointing or appointed, felt entitled to claim user experience could be simply appointed to an individual.

The Council

While I heard a great deal about the 2013 ATSIR and read relevant excerpts, my primary interaction with the document was through its implementation in the Council. I sat in on UX Council planning meetings, in subgroup meetings, and in an (yes, one) actual Council meeting. As much as I witnessed the effects of appointed UX personnel and group work lacking oversight, the backstory of the Council was always explained

³¹While I don't have an exact count on the number of hires, Steve gave the impression it was a handful of people. At a company the size of LTC—now roughly 100,000 employees—we can safely assume the need was underserved.

with the Council already in mind. As such, the explanations of the problems plaguing LTC always seemed to point to the Council as necessary. The creation of oversight for user experience activities, before standardizing activities themselves, seemed to standardized the story of how to effectively manage user experience.

When I joined LTC in mid-2013, the ATSIR had been released months earlier and the development of the Council was already under way. During the first meeting for the Council, the structure of the Council was the bulk of the conversation. While the Council was a central body, it was comprised of three subgroups that operated in parallel on specific areas. These subgroups were the Experts group, the Metrics group, and the Users group. These groups represented three different ways of evaluating the technology being developed in terms of user experience. The head of each group was also on the Council. The idea, as planned, was that projects would present to the Council and be either cleared by the three-part council or directed to meet with one or more of the subgroups. In the latter case, a project team would be given more detail of what to do after a more specific meeting took place. During the Council review meetings, the various subgroups were responsible for redirecting, rejecting, or approving projects based on their expertise. As such, the Council sought to function to systematically evaluate projects by performing triage as well as communicate and enforce standards of user experience practice on an *ad hoc* basis.

Subgroups

While the meetings will be recounted in a moment, some explanation of the subgroups is needed to contextualize.

The Experts group

The Experts group was responsible for heuristic evaluations of products based on interaction and industrial design principles related to user experience. As planned, evaluations focused on accepted design principles and company-wide design guidelines. This group was composed of user experience and interaction designers, and led by the director of user experience design for Grim, Hiram. Unlike the other groups, I had very little insight to the processes and guidelines of the Experts group. Hiram claimed on several occasions that the Experts Group would be the first to evaluate a product and could catch "90%" (field notes, 06.11.2013, UX Council Meeting) of the issues before reaching the other groups. What Hiram meant by "90%" of the issues was not clear, nor did the other group leaders agree with Hiram about ordering of groups. What was clear was that Hiram felt that user experience was primarily and best understood by designers. The odd name for the group seemed to be a relic of this assertion, namely that the designers were the experts with regards to user experience as a topic. Moreover, Hiram seemed to assume that the Experts group was solely responsible for *design* of the experience, while the other two groups were supposed to test and validate implementation.

The Metrics group

The Metrics group was responsible for evaluating projects based on industry- and company-accepted benchmarks and standards. This group focused on numerical and algorithmic studies of how people use a computer through recordable and documentable actions. The Metrics group could be compared to traditional human-factors research focused on usability. Unlike typical human-factors engineering, which often divides the user from the context of use, (Harrison, Tatar, and Sengers 2007) the Metrics group

focused on developing metrics and benchmarks that introduced contextual factors into measurable interaction traces. Certainly developing metrics that are both universal *and* context-aware is paradoxical, and a paradox that academic writing cautions against as "misguided or counter-productive" (Edwards, Newman, and Poole 2010) with regards to the nuances of user experience. Unlike the academic critique that assumes UX metrics stand alone as an evaluation, the goal of the Metrics group was to institute ways for engineering-focused teams to find breakdowns that otherwise would be invisible. That is to say, the new metrics and benchmarks were not meant to resolve issues or even identify issues as such. Instead, the metrics and benchmarks served a broad diagnostic function that employed recognizable methods and measurements (such as Power-On Time) to help teams consider user experience in subtle ways.

Brian, who was also the head of the Metrics group, explained that rethinking standards and benchmark tests was his initial insight that something was wrong about how LTC dealt with user experience. He explained that,

People were passing on the traditional [benchmark of storage and responsiveness] 'cause that's what they were measuring. As soon as they ran [this new assessment tool], they were failing. And the differentiation was the traditional performance benchmarks don't care about where you the user are in the workflow. [The new assessment tool] cared about the little things. So if it took you 4 more minutes to get to the place where you could start the encode of that video that mattered. But the [older benchmark] didn't care, right. It was just [about the total elapsed] time —"Oh elapse time is this long; you're fine or [not and] you fail." So with the ODMs, we looked under the hood to why they were failing. We could identify all of the operations inside the workflow that had bottlenecks. So every time they had a bottleneck, it impacted the user experience. And so the user if they were running the workload on that, they would say, "Uh this sucks! I might as well make a coffee because I can't do anything!" (Brian 11.05.2013)

Brian went on to explain that the goal of the Metrics group was to continue to develop benchmarks and metrics to enforce UX standards for both internal and external teams.

The Users group

The Users group was responsible for the evaluation of technologies based on existing user studies. This rather large category meant products were evaluated based on qualitative research. The Users group was composed of user experience researchers and led by Katrine. This group was accountable for informing teams of relevant user studies, aligning teams with findings related to company-wide market-/user-research, and recommending products undergo user testing. The Users group was the only group of researchers who actually interacted with people one-on-one. As such, this group based their evaluation on studies that used contextual inquiry, interviews, speak aloud walk-throughs, and other user-centered design research methods.

An Early Planning Meeting

As much as this was my first meeting, this meeting was not the first planning meeting of the Council. In an interview, Brian explained that the Council struggled to get started as it was hard to assess who were the right stakeholders to invite.

Sometimes you miss a stakeholder, and so you end up starting all over because someone gets aggravated. That took a while to get into place. And, I would argue, that [the Council is] not even very functional right now. [pause] It's exists, but we're not really doing anything to impact [PCT's] product lines at this point. And I would say that the people that are in that room are not all the players that we need to have there. So [the engineering team] and [the strategic planners], we need to get them in the room. (Brian 11.05.2013)

During this meeting, it was clear the issue was more complicated than just finding out who were the right people "we need to get in the room." Instead, getting those people into the room meant convincing stakeholder—and mainly project leads—that the oversight the Council provided was important.

In a rather large meeting room, seven invitees gathered to discuss the Council. The same truncated oval table that was overwhelmed during meetings for Grim now overwhelmed the small group. At the table was Olivia (from the Metrics group), Katrine and I (from the Users group), and Charlie, Grant, Bob, and Andrew (all of whom were invited due to their role on project teams); Brian and Hiram were conspicuously missing. The goal of these meetings were to get closer to defining the purpose and function of the Council. The committee needed to decide on the mission statement, goals, objectives, and strategies for action, and account for any missing or additional stakeholders currently not at the meeting.

One lengthy exchange focused on the overall purpose of the Council:

Katrine: *As I understand it, the goal of the Council will be to create some continuity across various projects and research within PCT. Projects will present what they are doing and the three groups will come together to discuss any issues, relevant studies, past findings, or just who to talk to in order to get the project aligned with LTC as a whole. Our role should be to suggest and assess the current work as experts in these disciplines and say "Here's the research you should reference. Here's what you need to research." and so on.*

Olivia: *Sure, that seems reasonable, but I don't think we should be the first resource. Maybe a repository of research and past projects could be developed so teams could do this themselves.*

Katrine: *Okay, okay. How about this?*

[Katrine draws a vertical diagram of boxes on the board. Between the boxes are arrows: "Usage → Docu(mentation) → Pres(entation)"]

Katrine: First, groups refer to the guidelines and documents their teams are working with. Then, if there are issues, they can refer to the repository of documentation, and then they present to us. At this last stage, here is where we can fill in the gaps with existing and past studies, and point them back to the repository or to ongoing studies, or to one of the subgroups.

[Katrine adds to diagram. She draws a three more boxes, stacked vertically and separated by arrows. "→ exp(ert) | user | met(rics) → Council → target]

Grant: Okay, but just to level set the purpose of the Council, what are teams doing now? What are they using? Are they doing user tests?

Olivia: Yeah, are we sure groups are using BKMs [best known methods] for user experience?

Katrine: Hmm. I don't think we can assume anything yet. I imagine if you are an expert in UX and know the BKMs, then you shouldn't need user testing, but, I mean, is it safe to assume that using BKMs means we don't need to test the user experience? The thing is if groups were using BKMs, then they wouldn't really need us, right?

Olivia: If that is the case, then groups should be starting with BKMs and standards for the industry before anything else.

Katrine: Sure, but a repository of these methods needs to exist for groups to consult them. We can't assume all the teams have experts or that the executives are experts in UX either. We need to make a repository of studies we have already done and of research and references groups should look to. Like "Hey, that button looks bad." [in a different voice] "Well how do you know?" "Well, I do!" because they looked at a study. I've seen those knowledgeable people leave the company and when you need to get them to make those decisions, as we have done in the past, they aren't here anymore. That way doesn't work.

[Grant writes on board under the heading "Purpose/Mission:" "expert advisor to usage GMs [general managers] and Execs [executives]"

Katrine: We [LTC] tend to force people into roles on teams. Just putting someone in charge of UX. But the Council help out teams or that person by giving them a place to look for info.

Charlie: Within each group, there should be someone who has expertise about UX, right?

***Katrine:** Again, I don't think we can assume anything at this point.*

***Charlie:** The UX Council would help sync though. We can advise whoever is in charge of UX, that person on what the team needs and advise on them on methodology, though maybe we need to advise them, "You need to hire a UX expert!"*

[Grant writes "objective watchdog" to summarize this conversation point under "Purpose/Mission"]

(field notes, 07.08.2013, UX Council, paraphrased)



This exchange reveals a few key points about what the planning team saw as the purpose of the Council. The Council aimed to both develop a repository of resources and guidelines for project teams to use. These self-guided resources assumed that within teams someone was in charge of UX design and would be held accountable to these resources. These resources were curated by the Council (and the subgroups) and embodied the wealth of knowledge often embodied in transient personnel. The resources were delegated expertise and aided teams by educating whoever was responsible for UX. In turn, this responsible party would account for this information in some fashion in the project's development. The committee assumed that teams would first consult the resources and then present in front of the Council. This plan and ordering assumed that the best known methods for user experience design and UX design work were capable of being implemented as such.

Since the Council could not reasonably trust that teams had any internal expertise—Katrine's refrain "I don't think we can assume anything"—assuming teams would appropriately consult and disseminate available resources seems misaligned. If all the teams needed to know were that standards existed, then why were teams not already searching for such standards? As such, the committee was assuming two things about the

current situation. First, the current issue plaguing teams was ignorance to standards around UX design existed at all. Second, the way to address the issue was through self-education. In short, UX design was a matter of knowledge, and UX design work was holding teams account to that knowledge.

While the committee held that education was the first step, they were also aware that education was not the only issue. The committee decided that the Council needed to always meet with groups rather than intervene only when teams sought out their input. While teams were free to consult existing studies and resources, these resources did not excuse them from meeting with the Council. The diagram "*Usage → Docu(mentation) → Pres(entation)*" meant to communicate that the Council was obligatory. The fact the meetings were mandatory meant that the Council was more than an advisor, that is, the Council did not provide feedback that could be ignored. The committee wanted the Council to sign off on all UX design work within PCT by confirming that projects were abiding to standards or stalling projecting in the event they failed to meet standards. In the latter case, stalling would occur by advising the general managers and executives that the project did not meet the Council's standards of practice. These managers and executives had the power to actually halt forward progress as they could conscript more work. Subsequently, teams would be advised on standards, and need to comply.

In this exchange the committee still had not figured out precisely what the Council's role should be. While the committee recognized the Council could not do the work for these teams—test features against standards—they also recognized that these best known methods, repositories, and elected UX practitioners may still misdirect groups and waste time, money, and resources without proper oversight. The committee

did not want to just make teams accountable by requiring check-ins and making resources available and durable, they also wanted to find ways to intervene on the project teams in substantive ways. On top of education, the Council sought to advise groups through procedure ("*Usage → Docu(mentation) → Pres(entation)*") and organization ("*You need to hire a UX expert!*"), as well as direct attention to the projects in question. As such, the committee was claiming that UX design was not a matter of knowledge but of knowledgeable judgement, and UX design work required an active role rather than passive one.

A Users group Meeting

During a subgroup meeting for the Users group, Shivank, a market researcher, projected a single slide that outlined the mission, scope, goals, and strategies of the Users group. He explained the slide needed to be refined so that it could be added to the UX Council slide deck that would be circulated within PCT. (see Figure 7) "Circulated" meant that the slide (as part of a slide deck) would be sent to the various teams the Council sought to advise, as well as the general managers and executives.³²

³²This tactic was frequently used at LTC. Katrine often circulated slides to teams that contained her research outcomes. By doing so, the slides and the email marked that the teams were aware of her recommendation as they were traceable in email records. If a project began to flag, the slides protected Katrine from being held accountable to the team's mistakes.

Users Group

Mission: <i>Ensure end user requirements inform & define best UX practices across LTC projects</i>
Scope: <i>Research focused on end users' needs, wants, behaviors, and assessment</i>
Goals: <ul style="list-style-type: none">• <i>Enable project leaders to conduct appropriate, effective and efficient UX activities</i>• <i>Highlight redundancies or need to redirect research activities</i>• <i>Flag gaps in knowledge and propose new research activities</i>• <i>Inform the UX Council to impact its target stakeholders</i>
Strategies: <ul style="list-style-type: none">• <i>Inform Metrics and Experts groups</i>• <i>Organize user research landscape mapping and feed central repository</i>• <i>Publish standards, checklist, identified gaps</i>• <i>Have ongoing checkpoints with target teams and projects</i>

Figure 7: Users Group explanatory slide, version 1 (field notes, 08.06.2013, Users group)

Katrine immediately took issue with Mission and Scope sections. She claimed that the Users group and the Council had no way of advising user experience work for all of LTC. While Shivank explained that many of the experiences spanned the entire company, Katrine argued that the Council had no organizational support outside of PCT. Shivank appended both the mission and the scope statements with the words "which affect PCT."

Ari, another marketer who was viewing the presentation remotely, recommended a change to the goals section. She wanted the goals "Highlight redundancies or need to redirect research activities" and "Flag gaps in knowledge and propose new research activities" to be moved to the Strategies section. Ari explained that highlighting redundancies and suggesting further research were activities that the Users group needed

to engage in to impact teams. Rather than ends in themselves, these activities acclimatized teams and individuals on how to manage their own UX design. Even more, the Users group and the Council should not be doing the work that teams need to do. Katrine and Shivank agreed. (see Figure 8, changes in bold red)

Users Group

Mission:
*Ensure end user requirements inform & define best UX practices across LTC project **which affect PCT***

Scope:
*Research focused on end users' needs, wants, behaviors, and assessment **which affect PCT***

Goals:

- *Enable project leaders to conduct appropriate, effective and efficient UX activities*
- *Be the end user advisor to the UX Council*

Strategies:

- ***Highlight redundancies or need to redirect research activities***
- ***Flag gaps in knowledge and propose new research activities***
- *Inform Metrics and Experts groups*
- *Organize user research landscape mapping and feed central repository*
- *Publish standards, checklist, identified gaps*
- *Have ongoing checkpoints with target teams and projects*

Figure 8: Users Group explanatory slide, version 2 (field notes, 08.06.2013, Users group)

These changes demonstrate a need scope and situate the institutional functions of a strategic design initiative. The Users committee identified ways they perceived impact could be guaranteed, namely within their specific organization. While UX design was a company-wide initiative, the Council could not have any impact without proper support in other organizations. By scoping where the Council could act, the committee was asserting that the Council was more than an advisory resource. As much as the Council

could provide feedback to teams in other departments, doing so crossed managerial boundaries and potentially delegitimated the Council as a whole.

Additionally, Ari's suggestion to shift "Highlight redundancies or need to redirect research activities" and "Flag gaps in knowledge and propose new research activities" from the Goals section to the Strategies section indicated that the committee saw the Council as not responsible for doing the work the teams themselves should be doing. While the committee wanted to be more than an advisor, they also wanted to be less than a UX design group. The Council would educate teams by modeling the things to look for—redundancies and gaps—but not do the work of correcting issues. However, in shifting these activities to the Strategies section, the Council also took on the important reflective aspect of design work. Where the teams were required to inquire and synthesize proposals (i.e. projects and features), the Council offered the reflection on whether outcomes appropriately addressed the goals of the project.

The final changes to the slide were suggested by Katrine. (see Figure 9) These were additions to the Strategies section. First, Katrine wanted to remove the word "publish" (Figure 8: Strategies, bullet five) and replace it with "contribute." (Figure 9: Strategies, bullet five) Katrine worried that the term "publish" was too explicit with regards to what the Users group would do. "Contribute" did not specify what the User group would add to the repository (e.g. writing reports versus curating reports to include), and so removed the suggestion that the Users group had additional work to do. Katrine wanted the Users group and Council to serve a mandatory advisory function to teams. Switching the term "publish" for "contribute," as Katrine argued, left room for the Council to assign teams tasks of publishing and documenting studies. The committee, by

way of accepting Katrine is reasoning, established that part of UX design work was communicating and contributing to the body of references.

Users Group

Mission:
Ensure end user requirements inform & define best UX practices across LTC project which affect PCT

Scope:
Research focused on end users' needs, wants, behaviors, and assessment which affect PCT

Goals:

- *Enable project leaders to conduct appropriate, effective and efficient UX activities*
- *Be the end user advisor to the UX Council*

Strategies:

- *Highlight redundancies or need to redirect research activities*
- *Flag gaps in knowledge and propose new research activities*
- *Inform Metrics and Experts groups*
- *Organize user research landscape mapping and feed central repository*
- ***Contribute to central UX repository managed by UX Council***
- ***Have ongoing checkpoints with target projects***

Figure 9: Users Group explanatory slide, version 3 (field notes, 08.06.2013, Users group)

The second change was removing the word "teams" from the final bullet point in the Strategies section. "Have ongoing checkpoints with target teams and projects" became "Have ongoing checkpoints with target projects." Katrine explained that the Council should only meet with teams working on a project and not serve as a general educational resource for PCT. Where the previous change focused on capacity building, this second change served a different purpose. By constraining when teams could meet with the Council (i.e. when a team had a *project*), the committee asserted that the Council served product development rather than professional development. As much as the

Council modeled how one does UX design through meetings, the committee saw the imperative of the Council as directly impacting the business-side of LTC. The Council would direct product lines. Focusing on product lines was tactical as the Council then served its own end of validating the usefulness of UX design to products.

The First Officiating Meeting

The first officiating meeting of the Council took place nearly five months after my first meeting at LTC. This meeting focused on a set of wireless technology features called WiSe. The presentation was led by Charlie—a member of the Council—but currently representing the WiSe project team. WiSe was a location-aware wireless connectivity feature set for detachable laptops. Based on where (geographically) a device connected to a wireless network, WiSe offered variable security for connectivity to proximal devices (i.e. phones, printers, other laptops, and shared music databases).

Rather than recounting the entire meeting, I want to highlight a particular exchange. This exchange occurred between Charlie, Arnold, and the Council (Katrine, Brian, and Hiram). Arnold was invited to the meeting since he present his team's work at a later date. The organizing members wanted to invite others to see how the process worked. About halfway through the meeting, Charlie showed an image of the set-up process for WiSe. The image showed four sequential graphical user interfaces that corresponded to a four step process of connecting, verifying, and securing the connection between two devices enabled for wireless data transfer. Katrine began:

***Katrine:** Okay, okay. Let me understand. Your criteria for a "good" set-up process is having less than 5 steps. Is that right? Is that what you just said?*

***Charlie:** Yeah.*

Katrine: So, you have four steps. How do we know that this is a "good" experience for the user during set-up? Can't you imagine that you have a four step process and hate each step?! Just because you accomplished one criteria does not mean that this is a good experience, right?

Charlie: Sure, but this four-step criteria was just a straw man to have conversations like this. I mean an experience is not all quantifiable. Four, five, six steps. These are just guidelines. The steps are more salient in description than in number.

Hiram: Sure, maybe I see your point. Katrine, maybe there is a correlation between how long it took with how satisfied they might be. Are there any user studies of this?

Katrine: That isn't my point.

Arnold: Hold on. Who decides on this goodness?

Katrine: What do you mean? Goodness?

Arnold: I mean who decides in the end whether the number of steps are a good enough criteria or something else? Does the exec in charge of the final decision decide on the criteria to evaluate the experience?

Hiram: Well, there is the person that is responsible for the wireless set at the executive level, and whether they want to spend more time on...

Arnold: I mean, who is the ultimate decision-maker in this group? Who, in the Council, has the final say to tell a project team what to do?

Katrine: It is me for the user-side of things, Hiram for heuristics, and Brian for metrics. Those are the subgroups. But the ultimate decider on projects are the general managers. The GMs of that specific product decide whether it is ready for the market. But ready for market doesn't mean a good experience if the GM doesn't know what that is.

Arnold: Well, do the GMs know about this, the Council, and will they accept that recommendation?

Brian: Yes, they know about the Council. They have all read the AT SIR.

(field notes, 10.02.2013, The UX Council-WiSe meeting)

✱✱

This exchange began when Katrine took issue with Charlie's criteria for evaluating the user interfaces for setting up wireless data transfer. Charlie contented that the criteria was only used as a "straw man" since no criteria existed to accurately suggest a "good" experience. The choice of the number of screens was based on past work that suggested that five or more screens frustrated a user. Katrine challenged this claim when she suggested that Charlie consider the possibility that the number of the screens could have nothing to do with the frustration. Hiram then suggested that the number of screens could relate to the length of time a user spent on the set up process.

Within this first portion of the exchange, the focus of the conversation was on the causal relationships underlying the design criteria. This exchange reflects on the hesitation the various planning committee expressed about assuming teams could simply rely on resources to accurately engage in UX design. For Katrine, Charlie's nominal attention to the resources was frustrating, hence her line of questioning that tried to have him recognize the insufficiency of such a criteria. For Hiram, the criteria could potentially point to a substantive causal relationship given that it is interpreted in a certain way. For Charlie, his design criteria were a "straw man"—that is, the criteria fulfilled the need to have a design criteria—and the subsequent conversation was the important take away. Charlie's claim that the criteria were a straw man challenges the role of the Council. In the Users group meeting, terms changed so that the Council was not responsible for doing work that teams should do themselves. However, if teams are forced to meet with the Council, then the Council becomes a necessary resource in UX design and the meeting constitutes part of the design work, namely reflection.

This flexibility of what the criteria meant led to the second part of the conversation from Arnold—who decides on what interpretation of any criteria matters? Arnold challenges the usefulness of the Council by suggesting that the institutional processes of deciding and the Council were misaligned. Without the GMs knowing about the Council and being willing to take their recommendations seriously, the Council, the criteria, and recommendations were token. All parts of the UX design work process are nominal if the executives can approve a project for market on their own. Brian assures Arnold that the GMs know about the Council since they all have read the ATSIR (that is, it had been circulated). While a GM could disregard the Council, the Council aligned with the ATSIR and made the GM solely responsible for any decisions counter to the Council's recommendations.

Discussion: Standardizing against Nominal and for Differentiation

The Council was created to help standardize UX design within PCT. The account reveals several tensions about the culture of LTC, the first of which is a tension between nominal UX design and actual UX design. Within the planning meetings, during the officiating meeting, and in interviews, the ripples of a history of appointing people to positions was clear. These appointments made the committee skeptical of what they could reasonably expect out of teams. For example, the planning committee could not trust that the individual on a team tasked with UX design was a UX designer or knew what that role entailed. The committee struggled with how heavy-handed the Council needed to be in order to assure that UX design effectively impacting product development, as outlined by the ATSIR. The Council was set up as a measure to help institutionalize standards around UX design, and so offset the lack of trained personnel.

In an interview Steve, the long-time social science researcher mentioned at the beginning of the chapter, explained why he thought the pattern of appointment persisted:

We [UX researchers and designers] use words and we make judgements. Now we might use words and make judgements based on theoretical background or based on experiential background or based on data we might know from the literature, but we don't explain all of that all the time like an electrical engineer doesn't explain the theory of a transistor every time they pop a transistor onto a diagram. Right?! But, so we [social scientists] don't do that either, but [...] it sounds like words. [...] So they [other employees] think that it's just words, so they think that they can do it. (Steve 05.19.2014)

Interrogating Steve's assessment, he raises an important point that reflects on the role of the Council. Steve recognized that the appointment of personnel happened frequently and repeatedly—he had witnessed a similar scramble to comply when human factors engineering became important to LTC. For those people unfamiliar with UX, UX design was nothing more than its expression in words and judgements. While these words and judgements came from extensive research, the appointment of individuals to the role of UX designer further substantiated that UX insights and design were nothing more than their expression in words and judgements. As such, Steve implies that exposing individuals to the rigors of user experience design and research would mitigate this myth. The Council, then, served to eradicate this form of nominal UX design. Rather than hire the needed personnel, the Council worked within the long-standing culture of LTC. Rather than counteract the appointments of UX designers, the Council sought to intervene on UX design.

Beyond just the fact that individuals were being made responsible for UX design with no training, LTC struggled with institutionalizing UX design because of the operating metaphor of componentization. As the previous chapter traced, UX design gave

the various components within a device a single frame of reference, and so forced teams to discuss their role within this whole. A large part of UX design work was embodying the connectivity amongst parts as the work of working together fell outside of the bounds of existing disciplines. Brian explained he wanted "engineers talking about experience and experience researchers talking about engineering," (Brian 11.05.2013) and in the case of Grim this fell on the shoulders of Katrine. In many ways, the Council fulfilled a similar role as Katrine—providing an embodiment of the ideas around connectivity.

Before the Council could have an impact, the committee needed to decide how the Council would resist being bypassed, that is, UX design being just *a way to do things*. In the various meetings, the committee inserted the Council within the product development process. By circulating the ATSIR and generating a mission that foisted responsibility onto teams, the Council became a part of product development. Making general managers and executives accountable to their recommendations, the Council effectively could stall projects for not being market ready. The Council became unavoidable.

In order to standardize UX design, UX design work needed to become part of product development rather than a parallel or auxiliary task. The Council refined its message and activities and left room for project teams to professionalize themselves. Self-professionalization meant iteratively learning about standards of practice by passing or failing standards set by the UX Council, and learning about resources (e.g. the repository of UX studies) to aid future work. However, standardization did not mean self-professionalization. The committee took measures to make sure the Council was not a passive resource, but an active body in the process of developing a product. Teams had to self-professionalize as a response of standards; these processes were not intended to be

one-to-one. Rather than standardize user experience by doing the work itself or by teaching UX design to groups, the Council standardized UX by removing alternative paths within product development. As such, the Council made UX design *the way things are done*.

The doctrine of differentiation: lessons learned from design thinking

Underlying planning the Council was a larger imperative—make UX design matter to the products LTC makes. A brief foray into the contemporary critique of design thinking explains this imperative in a tangential way. Lucy Kimbell highlights that the contemporary proliferation of the term *design thinking* bears little to no conceptual heritage to the academic scholarship that first coined the term (Kimbell 2011; Kimbell 2012). The originary scholars, according to Kimbell, developed the term *design thinking* in an attempt to understand the topics of interest and daily work of designers as distinct from other disciplines and practices. Design thinking intended to explain how designers uniquely approached forming, addressing, and representing topics. The term *design thinking* originated as a shorthand for the concept of "designerly ways of knowing" (Cross 1982; Cross 1992), or the distinctive features of the conceptual activities of designing. Design thinking, as such, addresses the ways designers think and addresses the way that thinking is expressed in making of products. Buchanan explains that,

the expressive appearance or styling of a product carries a deeper argument about the nature of the product and its role in practical action and social life. Expression does not clothe design thinking; *it is* design thinking in its most immediate manifestation, providing the integrative aesthetic experience which incorporates the array of technical decisions contained in any product. (Buchanan 1995a; original emphasis)

While the term *manifestation* points to a primacy of cognition, design thinking relies on and exists in the materialization of designing. This original scholarship on

design thinking splits the activity of designing into two—thinking and doing—while recognizing their co-dependence. As much as practice theory sees such splits as fallacious, it is important to note that this originary thread of design thinking does not reduce the epistemological activities of design to abstract cognition. Instead, design constitutes a form of proposing that extends beyond the cognitive and into the material activities of the work.

More contemporary writing about design thinking—notably writing stemming from IDEO CEO Tim Brown (Brown 2008; Brown 2009)—seems to fundamentally ignore the activity of designing altogether. The primary activity of design thinking found in Brown's work is *innovating*, which largely entails envisioning and conceiving of products. Design thinking, Brown argues, is a strategy to *differentiate* a company within a saturated market (Brown 2009) as it fundamentally questions the assumptions of a category, market, or company lineage. Design thinking is, in other words, a strategic design activity in that it provides direction to the company rather than order to its products. This notion of differentiation is shared with user experience design at LTC.

Differentiation is a term originated by economist Edward Hastings Chamberlin. Within the context of Brown's writing, the term points to the underlying economic motivation of these initiatives, namely the production of new capital within overextended markets. Chamberlin originally discussed differentiation in theorizing "monopolistic competition," or ways certain markets exhibit paradoxical characteristics of competition and monopoly simultaneously. (E. H. Chamberlin 1969) In these markets (and maybe all markets), competing products are not simply cheaper or higher quality. Products, while cast as alternatives, are different in fundamental ways. For example, within the laptop

computer market, various companies compete with one another in the category of "laptop," yet Apple and Dell laptops (or, really any two companies) do not interpret what a laptop is in the same way. In this way, Apple and Dell compete with products that are askew. These products offer different interpretations of the category itself—they create difference by reconstituting the criteria for evaluation. With differentiation as the goal, design thinking offers a suite of methods for uncovering and rethinking the assumptions underlying these criteria. This activity, for Brown, is the process of innovation.

The conflation of design, design thinking, innovating, and differentiation is found across several frequently cited texts (Utterback et al. 2006; Brown 2008; Verganti 2009; Brown 2009; Lockwood 2009). This conflation effectively erases the activities of designing from conversations of product development by replacing designing with ideation in search of novelty. Such an emphasis on idea generation lumps the subsequent work of developing these ideas and the intermediate work of deciding amongst ideas to the status of pure execution. As Bucciarelli and Schön point out, idea generation constitutes a minimal portion of designing. In short, design thinking highly abstracts product development.

The hope of strategic design initiatives, like design thinking as such an initiative, is to develop new products by reframing the meaning of a product category. (Verganti 2009; Brown 2009; D. A. Norman and Verganti 2014) Regardless of whether this actually occurs, strategic design initiatives produce other effects. Consider the following excerpt from Brown:

The causes underlying the growing interest in design are clear. As the center of economic activity in the developing world shifts inexorably from industrial manufacturing to knowledge creation and service delivery, innovation has become nothing less than a survival strategy. It is,

moreover, no longer limited to the introduction of new physical products but includes new sorts of processes, services, interactions, entertainment forms, and ways of communicating and collaborating. [...] The natural evolution from design doing to design thinking reflects the growing recognition on the part of today's business leaders that design has become too important to be left to designers. (Brown 2009)

Here Brown advocates for the incorporation of design (thinking) into all business functions. As the account of the Council highlights, incorporating new conceptual activities into all functions of a business is work in-and-of itself. While anyone should be able to engage in design thinking or UX design, doing either well is another concern altogether. The adjustment of theoretical framing of a process implies a wealth of contests and subsequent translation work. At LTC, the effects of disseminating the strategic design initiative at the organizational level led to deep confusion at project level (as in Grim) and at the product development level (as accounted for in this chapter). In short, the initiative as an imperative did not account for the initiative as work.

Lest the critique be unravelled because of its particular focus, a similar trouble plagues other corporate initiatives, include total quality management (Ciampa 1992; Huge 1990) and total design (Pugh 1991). These texts, like the contemporary design thinking writing, only barely address how corporations integrate low-level operational changes in such a sprawling manner as well as how mid-level organizational changes relate to, translate, or support operational needs. In the case of design thinking, an additional consideration is missing: how does one situate existing roles—such as designers and user experience researchers—when strategic design initiatives transform specialists into generalists, and flatten the common skills, activities, and insights. This particular problem will be reserved for Chapter 8 in a discussion of ambience.

Within the design management and organizational design literature, integration is a central concern. Not surprisingly and like advocates for design thinking, this scholarship often focuses on systems-level, top-down, or already-established initiatives (Wikström and Jackson 2012; Acklin 2010; D. Lee and Nam 2012; Y. Lee and Evans 2012). These initiatives are analyzed in retrospect, theorized in the abstract, or discussed in terms of best known methods (Liedtka and Parmar 2012; Best 2006; Rohn and Wixon 2011). The main oversights are that the process of integration lacks contextual factors of the work environment and fails to account for how the top-down initiatives are planned, decided upon, and executed as daily work beyond management. For example, Jay Galbraith (2012) proposes organizations, especially those with complicated products (e.g. computing technologies), have more than one executive in charge of the final decision. In this arrangement, executives in charge of one of a few interrelated disciplines—say, engineering, design, and marketing—convene to make informed decisions about products. The assumption is that the decision process is an objective, rational, and flat process, where the executives have equal contribution. Assuming these conditions, no direction is given for how teams underneath these executives organize or relate in order to accomplish working leading to these decisions. Even more, though more conjecturally, the specific culture of an organization would seemingly weight the input of certain executives more than others, stripping even the founding assumptions of much veracity.

Within the few discussions that mention both strategic design initiatives and organizational change, the work activities are no more clear. For example, Bucolo et al. (2012) explains, like Brown, that design offers companies new ways to consider their products and product categories. As such, integrating design requires all parts of the

company to interrogate the meaning/value of products rather than how to make it. Bucolo et al. recommend four new roles need to be created within the organization to support this comprehensive integration of design—design leaders, who advocate at the managerial level; design interpreters, who generate cross-organizational opportunities that abide by new guiding principles; transitional engineers, who translate the various new guiding principles and questions into concrete products; and transitional developers, who connect the new products to the business and market opportunities. As much as these roles are supported by the empirical account, such as the need for individuals on teams advocating for UX design or GMs and executives championing the ATSIIR, these roles distract from the actual issue: organizational structure itself. These individual roles fit within organizations, and highlight necessary embodied personnel roles, yet assume that strategic design initiatives can operate under the existing protocols. Moreover, even though this literature mentions the necessity of advocates, and so recognizes the potential for resistance to a new work practice, none of these authors (or truly any accounts of strategic design initiatives) mention strategies or tactics to deal with resistance beyond the sheer importance of the initiative itself. In other words, this literature assumes the biggest problem is knowing what the initiative intends and not how to actually do something about it.

These accounts and others reformulate the same general themes—strategic design initiatives lack accounts and so theorization in terms of existing work. Even in those domains where strategic design initiatives are conceptualized as organizational change, they are done so without pairing such change with the work of organizing. Paying attention to this parity activity of organizing holds insights into how individuals organize,

resist, and negotiate the structure of the strategic design initiatives. The goal of this chapter is to pay attention to the institutionalization of user experience. Much of the writing around strategic design initiatives emphasizes exposing problem setting and other design activities to the entire company in order to institutionalize it. The merits of the initiative are therefore self-evident, and resistance to change is a lack of knowledge about these merits.

This chapter has argued otherwise. The process of institutionalization is a process of self-effacement, or making the strategic design initiative invisible and commonsensical, and conflating the activities of execution with a strategic causality. Erasing the strategy comes from institutionalizing it, and transforms user experience from *a way to do things* to *the way things are done*. This chapter argues that one mechanism of turning work into strategic design work is reducing resistance by removing alternative modes of working. In this case, institutionalizing aspects of the initiative effaces it, and structurally professionalizes practitioners (i.e. self-professionalization) through accountability.

CHAPTER 7

BUDGETING UX

OR, FINDING JUSTIFICATION FOR DESIGN WORK

The present chapter offers an account of a software project called PixelTouch. PixelTouch was cancelled, but the project team did not accept that decision. In their eyes, the decision to cancel PixelTouch was under-informed and misguided. The PixelTouch team felt their software was too vital to the end-user and too entangled in other projects to be cancelled without serious implications. The executive in charge of allocating budget felt otherwise—the software did not provide enough potential return on investment to justify its cost. While the official reason for the cancellation was budget, the cancellation was more complicated than simply allocating limited resources to a niche project. Underlying the decision to cancel (and later reinstate) the project were ideological differences held by the executive and the team, embodied in the processes of budgeting and the processes of user experience design, respectively. This chapter explores these ideological conflicts that inform, constitute, and justify decision-making.

The previous two chapters present accounts of the daily work activities of user experience design. While not an explicit focus, decision-making activities are found within both chapters. In Chapter 5, integrating user experience into technology development and engineering meant negotiating conflicting relationships amongst components, disciplines, and activities. The tension amongst holisms revealed how the team envisioned and allowed UX to inform, influence, or otherwise impact the development of Grim. While some interpreted holism to mean indelible, objective, and unchangeable, others interpreted holism to mean relational, situated, and responsive. The

account from Chapter 5 emphasized the temporal and procedural implications of these different holisms. Another way to consider this account is how these different notions of holism presented different criteria for decision-making within the Grim team.

Without question, the differing holisms depended on distinct ideological views of product development. One camp asserted that UX design set the vision and direction of the project. The value of UX design came from its ability to detach from the existing landscape of projects and technology, and envision technologies in the absence of such constraints. From this perspective, design necessarily preceded development as the latter stage realized plans in technical terms (i.e. executed). As such, changing circumstances threatened the ideological fabric of this view—holism and indelibility were synonymous insofar as the designed user experience could (or should) not change due to technical concerns. Again, UX design sought to detach from the current landscape. For the team, the sequential stages of design and development were unfamiliar. *The whole already built in mind* meant that the various components were decided upon *prior to* building, binding decision-making to the constraints set forth. Another camp worked with a different notion of holism—the whole device was a relation body, considered together, yet decomposable into related subparts. Underlying this interpretation of holism was the different ideological stance that UX design integrated the various elements of a project into a coherent whole, thus *setting and resetting* the vision. Unlike componentization, which operated in a partitioned fashion, *building with the whole in mind* maintained that components worked together, and so the notion of the device was the relationship amongst components. In this way, this second notion of holism left room for decision-making that responded to emerging conditions. In coordinating user experience across the

team (a microcosm of company-wide efforts to coordinate), the different modes of decision-making led to incommensurate notions of how and when to act.

Another example of decision-making and ideology comes from revisiting the account of the UX Council. In Chapter 6, institutionalizing user experience meant creating an operational and organizational body to enforce, delegate, and professionalize user experience across PCT. The Council set out to unify UX activities across PCT, but first needed to unify itself. The Council's creation required the planning team to determine what institutionalize meant with regards to user experience practice as well as user experience practitioners—*who* was and was not a UX practitioner was determinate of *what* was and was not UX practice. These decisions meant negotiating when and how the Council engaged project teams in order to intervene effectively, and how much intervention was necessary. Rather than serve as a passive resource, the Council decided to vet progress and sign off on decisions. Underlying the organization of the Council was an ideological stance that asserted that UX design required particular expertise and domain knowledge, yet could be proceduralized and externalized.

The Council entered into a landscape where UX lacked enforcement and the professional standards failed to be hired in. As *a way of doing things*, UX was a parallel activity that lacked the imperative that engineering standards had. Without embedding oversight of user experience design into the product development process—that is, without making UX a mandatory checkpoint—decisions were mere recommendations, making UX design dismissible and inconsequential. By shifting from being oversight to operating as a checkpoint, the Council sought to act as gatekeepers within product development. This shift to becoming *the way of doing things* at LTC addressed issues

related to (self-)professionalization by distributing the activities UX to the product development process itself.

In the previous accounts, decision-making might be interpreted as the residue of ideological actions, but altogether a neutral process: decisions were made through adequate and sufficient evidence that was ideologically defined. While ideological stances informed decision-making, these ideologies were understood in different terms—their representation in terms and in bodies. In this chapter, the relationship between ideology and decision-making is examined more closely and with a tighter coupling. At issue within the account of PixelTouch are both the units and justification of making decisions. For example, one way to understand PixelTouch was as an isolated project. Since budgets, teams, and deadlines were attributable to PixelTouch, then PixelTouch needed to be judged, understood, and kept alive through the stand-alone justification of the project team. From this perspective, PixelTouch was a software project. Like many projects, PixelTouch was informed by user experience design, yet remained within a legacy of budgeting and resource management that considered projects as self-contained units. The ultimate justification for projects was in terms of the overall market. A project received budget when it offer a product that has a large enough return on investment. This ideology valued risk reduction and wide market appeal.

Another way to understand PixelTouch was as a fundamental part of a (larger) user experience. PixelTouch software mediated hardware interactions, contributed to end-user value, and served a larger agenda. As such, PixelTouch was a vital aspect of a wider set of projects. For the team, PixelTouch could not be reasonably separated or understood outside of this larger set of activities and technologies since the entire feature set

provided would be encountered by a hypothetical end-users as a whole. PixelTouch, like many contemporary projects, was informed and entangled by user experience design. Contrasting componentized engineering or individuated budgets, PixelTouch exemplified the emerging strategy for a coordinated user experience across a variety of projects that more deeply integrated a product of a different sort—an experience. This ideology valued the totalizing effect of a product (that is, an experience) and the personal fulfillment of an end-user.

Underneath these two perspectives about the PixelTouch software was a fundamental conflict about how to justify decisions. The first perspective stemmed from the well-established budgeting strategy of zero-base budgeting. The second perspective stemmed from the newly-developed product development strategy of user experience design. While conflict and negotiation are inevitable to decision-making activities (otherwise the decision would have already been made), this account explores the ways justification and proof were particularly challenging for the PixelTouch team because of ideological conflicts embodied in the processes of work. With decision-making as the explicit focus of the account of PixelTouch, this chapter further unpacks how a strategic design initiative is carried out on a daily basis. The goal is to reflect on various ideological notions of value—return on investment, end-user value, and customer value—and how these notions collide before and during decision-making.

The death and life of PixelTouch

In simplest terms, PixelTouch was a software that tracks where a user's hands are within the bezel of a touchscreen device. While touchscreen devices, such as smartphones, tablets, and an emerging number of PCs, are designed to respond to where a

user touches (typically a finger or set of fingers), touches must be performed within the active screen area of these devices. Around this active area is a bezel. (see Figure 10) On laptops, the bezel is a vestigial feature—a result of needing more space than the immediate screen size to hold the sensors, antennae, camera, and other hardware that is located behind the screen.

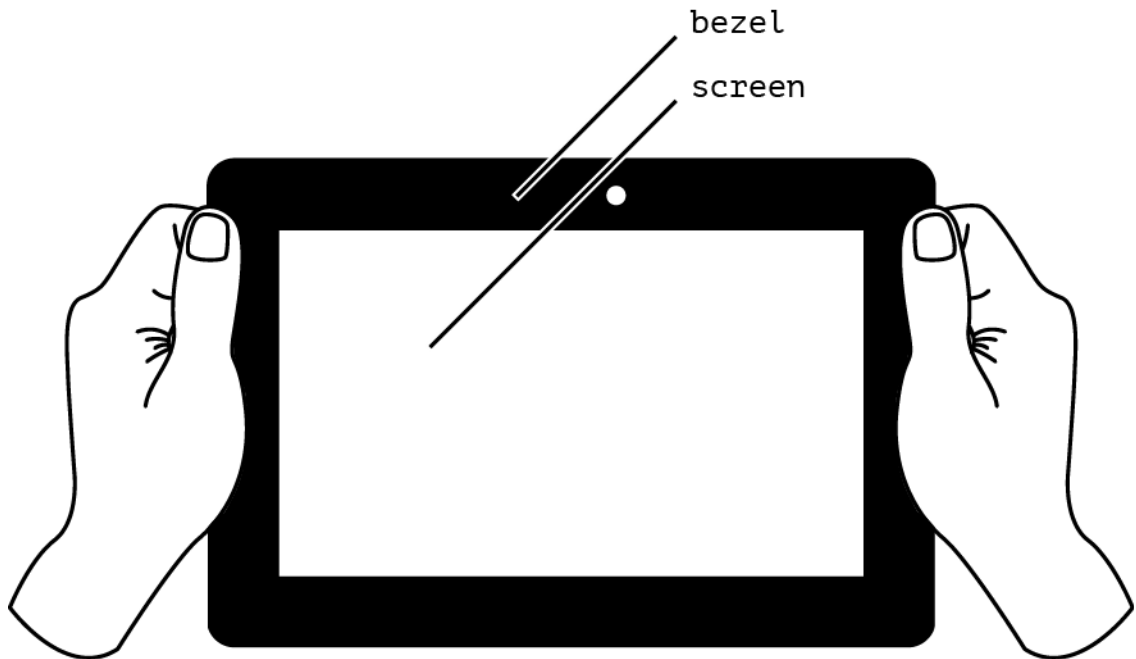


Figure 10: The active screen and the non-active bezel.

In recent years, the bezel has begun to serve a rather important functional purpose on tablets—a place to put one's thumbs. Unlike smartphones that can easily be held with one hand, tablets are far more unwieldy due to their weight and size. Given their intended uses (e.g. reading ebooks, browsing the web, or watching videos), tablets are often held for long periods of time, making a single hand or arm tired. Since touchscreen devices, like tablets, register clicks, swipes, and context menus³³ when a finger is within the active screen area, the bezel provides an inactive space to securely hold a tablet without

³³Context menus are menus that appear while registering a secondary click. On touchscreen devices, secondary clicks are commonly registered when a finger is held on-screen for an extended period. These types of menus often offer options related to direct manipulation of on-screen objects, such as copying text or hyperlinks, aligning, arranging, or downloading images, or switching cursor functionality.

accidentally triggering any on-screen actions. As such, users often wrap their thumbs onto the screen-side of tablet devices, gripping them with one or both hands when not performing actions in the touchscreen area.

While the bezel now serves an important ergonomic purpose, it presented an opportunity in the eyes of the soon-to-be PixelTouch team. The next generation of detachable touchscreen devices (such as Fable, Grim, and Aesop from the exemplar units project) were (potentially) full of a variety of sensors. These sensors gave the devices new capabilities, such as multiple layers of biometric verification and complex, multi-finger gestures. The PixelTouch team started by wondering how the bezel on a detachable device might become an active part of a device rather than remain dead space. While this may seem to defeat the current purpose of the bezel on tablets (that is, being *inactive*), it makes more sense when considering that the bezel increases the overall size of the device. For a 12-inch screen (12-inches is measured diagonally for screens) with a uniform half-inch bezel, the overall tablet size is more than an inch larger when measured corner-to-corner. When selling a tablet, this inactive space becomes a negative feature despite its importance to ergonomics. However, if this space became useful beyond ergonomics, the PixelTouch team hypothesized, the bezel could become a point of differentiation for an OEM (one, if not *the*, purpose of UX design at LTC; see Chapter 6, section titled The doctrine of differentiation: lessons learned from design thinking). For example, if a device has thumbprint biometric log-in (as smartphones have begun to introduce) and a user places her thumbs in the bezel while holding the device, the bezel could be marketed as a security feature. In other words, when size is a major selling point of tablet and touchscreen devices, inactive space is problematic. Certainly, one tactic is

reducing the size of the bezel, but this does not solve the ergonomic issues of holding a tablet. With this in mind, the PixelTouch team worked with several other teams to develop a set of features called the Touch Experience.

The goal of the Touch Experience was to enable more responsive touch capabilities on the next generation of detachable devices. Within this collection of teams, one group worked on developing and embedding a series of minimal bezel sensors. Another team reengineered how the screen was mounted to the back panel to allow these sensors to be embedded in the bezel. Still another team worked to add visual and sensory cues (e.g. LEDs and vibration motors) within the bezel to indicate successful actions. Still more teams worked on other elements from biometrics to battery usage and cooling. While most of these teams pushed forward on the hardware, the PixelTouch software was vital. The PixelTouch team focused exclusively on the software that gave the user the ability to tap and swipe within this region. Without PixelTouch, all the other engineering work was seemingly for naught.

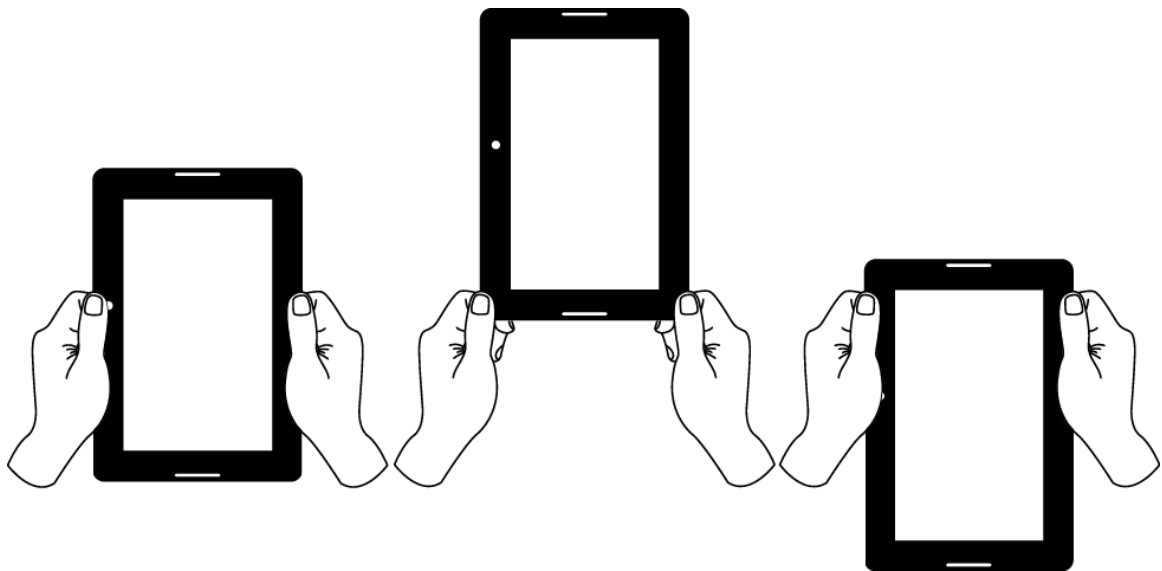


Figure 11: PixelTouch v1 gave the device awareness of where the user's hands were on the bezel (the black band around the device). By doing so, the user could perform select actions with the device and the device would offer certain functions based on hand position.

The main purpose behind PixelTouch was tracking where a user's hands were within the bezel of a device, and giving the user local controls over select actions based on this position. (see Figure 11) In PixelTouch v1, the software simply tracked how a user held the device. Based on where hands were within the bezel, the team gave simple controls to the user, such as scrolling up or down by brushing a thumb in the bezel and flipping ebook pages with taps of the right (forward) or left (back) thumb. While these particular actions were redundant on touchscreen devices, the goal of PixelTouch v1 was to test a variety of potential problem areas from hardware and software to integration with other aspects of devices. For example, since a user's thumbs would remain in the bezel for extended periods of time while, say, reading an ebook, the PixelTouch team needed to figure out how the software would handle slight hand motions as a user adjusted the tablet subconsciously as they read. Accidental clicking or scrolling in these instances would make the added functionality of the Touch Experience more of a nuisance than an enhancement.

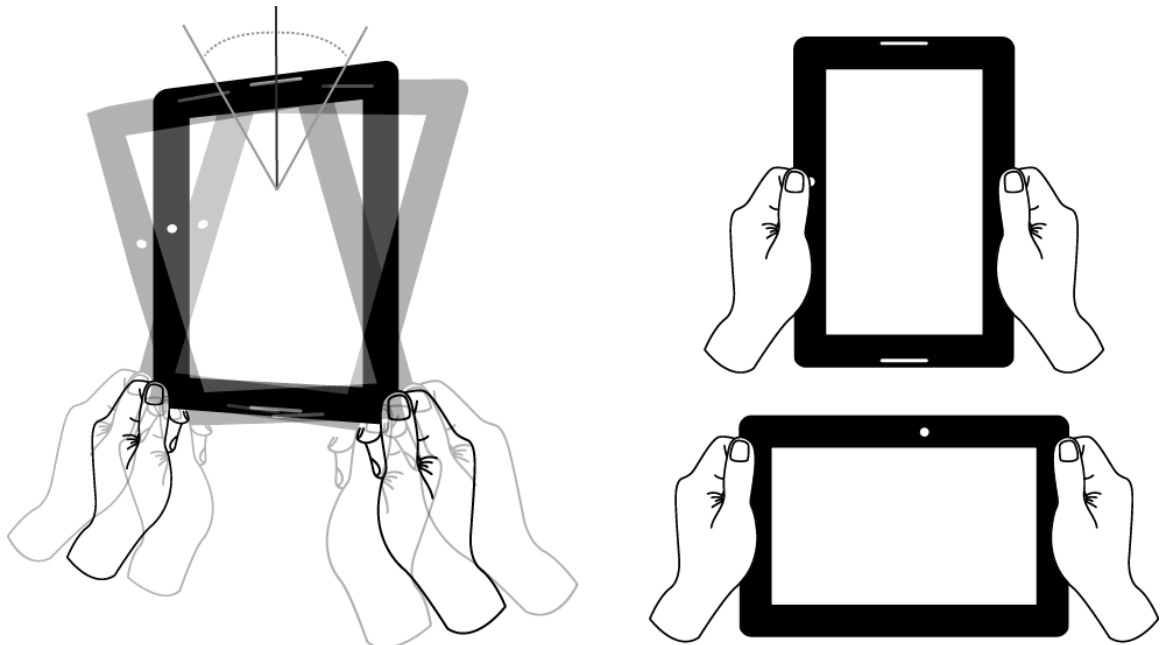


Figure 12: The standard dimensions of orientation on current devices.

Part of the software engineering accomplishment of PixelTouch v1 was using the suite of sensors already in tablets to predict intention. Current tablets and smartphones (and an increasing number of laptops) have a suite of hardware sensors to detect positioning. Most common are accelerometers and gyroscopes. Accelerometers detect motion by detecting relative changes in velocity (e.g. when the device is jarred or moved) and gyroscopes detect orientation by detecting absolute orientation in space (e.g. horizontal or vertical positioning in space). (see Figure 12) PixelTouch used these positioning sensors to decide whether the user was shifting the device in their hand or actually performing a gesture.

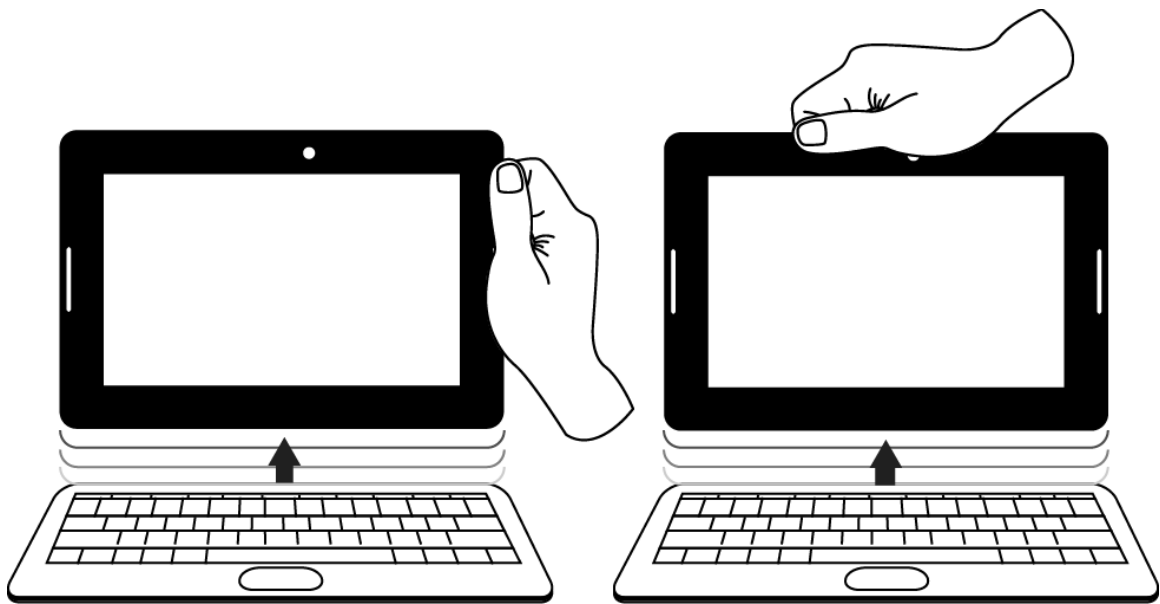


Figure 13: Undocking presented a challenge for the PixelTouch team as the sensors were activated only when the device was detached from the keyboard to conserve energy. When the sensors were turned on, an early version of PixelTouch led to many errors.

One of the biggest technological challenges in this first version dealt with knowing how a user held the device while removing the screen from the detachable base. (see Figure 13) The added sensors in the bezel used a minimal-but-noticeable amount of battery power. When the screen was docked on the keyboard, the bezel sensors needed to be turned off. Upon undocking, the sensors would turn on. Toggling the bezel sensors on

or off was simple technically speaking, however presented a problem for usability and user experience. Early user tests revealed that this transition period—gripping the device, removing it from the base, and shifting it to be held with two hands—led to accidental swipes and clicks. Since the goal of undocking tended to be for productivity (e.g. showing someone an image) or comfort (e.g. moving to a chair to read), the accidental touches were very frustrating for users. To compensate for these erroneous actions, the PixelTouch team added a slight delay to the first gesture performed in the bezel. The team referred to this as the delay glitch. (The delay glitch was part of the fourth user study.)

With the kinks worked on in PixelTouch v1, PixelTouch v2 added two important features. The first feature was the introduction of two finger gestures, such as zooming by sliding both thumbs toward the edge (zoom in) or toward the screen (zoom in), and navigating between desktops by slide both thumbs left or right. These two finger gestures greatly increased the potential capabilities of PixelTouch. The second feature was the ability to customize the bezel controls from a set list of actions, ranging from adjusting the volume and brightness to toggling music players and video. The user was able to define a few actions, their gesture, and their location into the bezel through a user interface. (This set of features was tested in the fifth user study.) By being able to specify where a gesture would take place, the team opened up the potential for customizable controls based on the user's handedness. (see Figure 14) Again, the team felt this customization was a big selling point for the Touch Experience as a whole as well as for promoting the next generation of detachable devices.

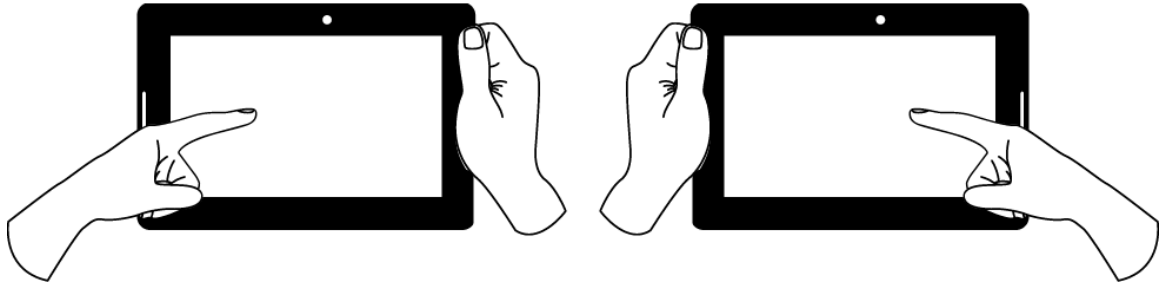


Figure 14: PixelTouch v2 the ability to customize the controls within the bezel to allow for more complicated behaviors.

The death of PixelTouch

After over a year of development, the PixelTouch project had been "ZBBed." This term *ZBBed* was new to me when I joined LTC; it was a euphemism for *cancelled* and refers to zero-base budgeting, or, ZBB. The verb form indicated that a program, whether a project, a team, or an activity, fell victim to budgeting cuts. While the verb ZBB was casually thrown around in reference to now-defunct projects or as a Boogey Man to scare teams into action, rarely did the noun ZBB ever appear outright. Rarely did anyone talk about the budgeting activity in explicit terms, and no one ever explained what zero-base budgeting was beyond how projects needed to justify themselves in terms of line items. The term ZBB had become woven into the fabric of LTC. Yet, when the team referred to PixelTouch as ZBBed, it meant more than cancelled.

ZBB is a budgeting strategy coined by Peter Pyhrr (Pyhrr 1973) and brought to the attention of Americans by President Jimmy Carter (GAO 1997). In a report on performance budgeting, the US General Accounting Office explains ZBB as follows:

ZBB in theory required expenditure proposals to compete for funding on an equal—starting from "zero"—basis. ZBB prepares a detailed identification and evaluation of all activities together with alternatives, and spending necessary to achieve desired plans and goals. Where federal budgeting in recent years had made incremental changes to an accepted base of past spending, ZBB in contrast sought to look below the base, evaluating the efficiency and effectiveness of current operations and comparing the needs of one program against the needs of other programs

that might be of higher priority. ZBB also looked to a greater involvement of program managers in budgeting as a way to identify new efficiencies and to incorporate better analysis into budget decision-making. (GAO 1997)

Obviously, governmental and corporate budgeting differ in many ways, such as the accountability of programs to stakeholders and the relationship between departments and the whole. Still, the relation of ZBB to both corporate and governmental contexts demonstrates a primary motivation for this strategy, namely, the elimination of redundancies, overlaps, and mess due to size. ZBB, first and foremost, is a budgeting process created to stave off bureaucratic creep, or the passive avoidance of reflecting on the current state of activities that often leads to bloated organizations. ZBB requires projects and teams to reflect on work activities, and explain how these activities contribute to an overarching trajectory or goal, such as a corporate initiative. In this way, ZBB was a strategic budgeting scheme rather than a purely administrative one. Often strategic contributions meant novelty or importance. Being ZBBed meant that PixelTouch failed to prove its worth and failed to demonstrate its contribution to the larger goal of heralding the next generation of touch-enabled laptops.

A second feature of ZBB worth highlighting is that ZBB prioritizes programs against one another. While an individual team needs to detail and justify its activities, teams within an organization are ostensibly competing against one another for a finite budget. The total operating cost is not fixed upfront, or, at least not fixed upfront according to the doctrine of ZBB. (Pyhrr 1973) With the explicit goal of ZBB always being increased operational efficiency, programs compete with each other, in some respect, for an indefinite slice of an overall budget. In order for a program to continue, someone needs to weigh budgeting allocations relative to other programs. For

PixelTouch, this person was Rohit, an executive vice-president. When a program lacks sufficient justification, its budget can be reduced or cut entirely. This latter option was what Rohit did to PixelTouch. In this budgeting process, programs are evaluated and justified in terms of what they will do (the project's value and contribution) rather than what they will not do (the project's expenses in relation to last year). In other words, the ZBB requires teams to justify their budget in terms of their goals rather than in terms of avoiding overhead. Here again, ZBB is strategic in that, as a budgeting activity, teams justify expenditures in terms of a corporate vision. Even in doing so, whoever is in charge of the budgeting decisions (in this account, Rohit) needs to understand both the goal and the activities in detail.

By focusing the budgeting process on what will be done, Pyhrr, means that budgeting functions proactively with regards to funded programs. Pyhrr explains,

The process requires each manager to justify his entire budget request in detail, and puts the burden of proof on him to justify why he should spend any money. Each manager must prepare a "decision package" for each activity or operation, and this package includes analysis of cost, purpose, alternative courses of action, measures of performance, consequences of not performing the activity, and benefits. [...] Zero-base budgeting provides top management with detailed information concerning the money needed to accomplish desired ends. (Pyhrr 1973)

Fundamental to this justification and prioritization, as Pyhrr explains, is the decision package. This package is a detailed account of the program, from "people" to "service received or provided," from "line item of expenditures" to "capital expenditures." (Pyhrr 1973)

At the root, zero-base budgeting functions as a form of strategic planning rather than a process of procurement. The decision packages outline the needs of a program, and how other activities might achieve the same or different ends. For example, if a team is

developing software, the decision package might outline an ideal program, a scaled-back alternative (i.e. fewer features or less ambitious aims), and an outsourced alternative (i.e. same feature set, but implemented elsewhere). In each of these alternatives, the budget may vary, as well as head count, distribution of labor, and end product. What does not vary is the goal of the program, which is explicit and (relatively) fixed. Lastly, that goal needs to be in alignment with some corporate direction. In sum, ZBB, like UX design in the case of strategic design initiatives, is a scheme and mechanism to produce a strategic vision.

In terms of work activities, this proactive form of budgeting requires "greater involve from program managers" (GAO 1997) as well as "top management" (Pyhrr 1973). As such, decision packages need "units of activities that can be analyzed for discretionary decisions," or "decision units" (Stonich 1977). These decision units "need to be established at an organizational level high enough so that the person responsible for the operation of the unit [...] has effective control over the budget dollars [and] is presented not only in terms of dollars to be spent, but also of the activities to be performed." (Stonich 1977). As the decision unit at LTC was the project, ZBB fits within the historically componentized culture of LTC. Where ZBB requires discrete budgets, LTC has built its core work metaphors around discrete units, both in terms of programs (that is, the outcomes of work) and in term of processes (that is, the means of working). The core assumptions of zero-base budgeting, in terms of the programs themselves, is that programs can be scaled up and down, alternatives are available, and programs do not overlap. Here we can return to PixelTouch.

To recap, PixelTouch had been ZBBed, and ZBBed euphemistically meant cancelled at LTC. Being ZBBed meant that PixelTouch failed to be prioritized against other programs vying for budget. In other terms, PixelTouch failed to align with the strategic vision of LTC by not justifying its project in terms that warranted allocations. With no budget, PixelTouch had no head count, no resources, and no way to justify time on it. Furthermore, while ZBBing PixelTouch was the decision of an executive, the responsibility for that decision, under the doctrine of ZBB, falls on the PixelTouch team. Zero-base budgeting requires teams to amass an argument for what money will be spent on. In this way, saying "PixelTouch was ZBBed" was an indictment of the team more so than than the executive.

As may be clear from the previous description of PixelTouch, several problems existed with this decision, all of which needed to be communicated to preserve the project. First and most importantly, the PixelTouch software was part of the large set of projects called the Touch Experience. Without PixelTouch, the Touch Experience fell apart as PixelTouch controlled a central feature of responding to how the user held the device. If the device no longer had a way to register how it was being held, other aspects of the Touch Experience were muddled or altogether worthless. In this way, ZBBing PixelTouch would have inadvertently damaged the Touch Experience. Moreover, parts of the Touch Experience were not ZBBed, which pointed to a lack of understanding of the connection of parts. Second, PixelTouch v1 was not yet finished, yet had been promised to an OEM within the next few months. Canceling PixelTouch meant that the team needed to either finish the software without budget (and so, without head count, legitimate justification, and resources) or break a contract with an OEM and risk ruining

a relationship while paying the OEM the perceived cost of the units now sold without PixelTouch v1. Neither option was particularly desirable. Third, PixelTouch v1 was developed exclusively to develop PixelTouch v2. While the project was never thought of in these terms, PixelTouch can conveniently be understood as purposely broken into a proof-of-concept/engineering prototype (PixelTouch v1) and the actual PixelTouch software set (PixelTouch v2). For the team, stopping before finishing PixelTouch v2 meant that PixelTouch v1 should never have happened in the first place. For Rohit to approve the project in the first place, only to cancel it before being finished, meant the team did a poor job of initially explaining the goal.

While these considerations make a strong case for keeping PixelTouch "above the base," the executive, Rohit, in charge of this decision seemed either unaware of all of these considerations or unswayed by their original argument. Regardless, the PixelTouch team needed and wanted to reverse that decision for these and other reasons.³⁴ The team, which included Katrine and I, decided a user study could aid in convincing Rohit. We had a very limited window to gather all the necessary information. A meeting that had already been scheduled at RF3 immediately following the decision.

As already claimed, ZBB is a strategic form of budgeting, and so a comparison with UX design activities provides a way to compare (and really contrast) two simultaneous strategic activities.

The Unit of the Burden of Proof

³⁴I would be remiss if I didn't mention that along with the functional justifications, the PixelTouch team had invested a long time developing and refining the software, and so was personally invested in the project. This should not be surprising, but it is often excluded from accounts that focus on the problems of the matter. That is to say, amongst the problems that existed was the problem of pridefulness. In the meetings leading up to the last minute user interviews after the ZBB decision had been made, the engineering and design teams displayed uncharacteristic emotions, mainly in the form of cursing. ZBBing PixelTouch struck the team in a personal way.

Central to ZBB is the concept of "the burden of proof" (Pyhrr 1973). As already described, the burden of proof within ZBB means that programs must justify their activities in detail according to a decision unit. At LTC (and most settings, for that matter), the program or project is that unit since ZBB deals with the organizational scale. The PixelTouch project, however, needed to communicate that the project was interrelated with other projects. The team operated at the scale of the user experience, and so the team wanted to argue PixelTouch could not be cancelled on its own. For the team, the decision unit needed to be the extended group of projects under the label of the Touch Experience. For the PixelTouch team, this feature set was the only way to make budgeting decisions.

The challenge for the PixelTouch team was finding a way to still operate within the confines of ZBB's decision unit—the project—while also demonstrating that the project as a decision unit failed to capture the entirety of what PixelTouch did. The team needed to graft one unit onto or into the other. The project team needed to demonstrate that PixelTouch could not be canceled by demonstrating that PixelTouch was part of something greater *and* demonstrate that PixelTouch, as constitutive of the Touch Experience, aligned with the corporate vision for the next generation of detachable devices. The group decided that the user was the right unit to exist in this hybrid way. As will become evident, the team sought to mobilize the user to show that PixelTouch was connected to the larger feature set of the Touch Experience. While the team initially felt that the user was a convincing way to argue for PixelTouch, the user presented problems.

A User Study to End User Studies

PixelTouch had already undergone four user studies. Save their existence and a cursory knowledge of their content, I was never briefed on the particulars of the first three user studies. I knew the studies led to the development of the basic features the software and were more exploratory. The fourth user study occurred when I first arrived at LTC. This user study focused on a particular perceptual issue—the delay glitch—with how PixelTouch worked. The PixelTouch software was developed for an emerging genre of laptops that could also be used as tablets, sometimes referred to as detachable or convertible laptops. Since these devices could change between being used as a laptop with a keyboard to a touchscreen tablet, the software employed onboard sensors give an awareness of if and how the device was being held. In order to remedy one issue related to the Touch Experience, the PixelTouch software team introduced a delay. Upon detaching and prior to the first gesture, the device would not register any touches. When a user actually intended to do something, the device would finally respond, but after a subsequent processing delay that was unavoidable, that is, was a glitch. The fourth user study aimed to understand how perceivable this glitch was. The team wanted to have evidence that the issue was not important—that is, perceivable—enough to fix. The study provided a simple case for Katrine to teach me her techniques for doing a user study.

User Study Four: The delay glitch

The fourth user study was structured around participants completing a series of tasks with a detachable device. These tasks including navigating to a specific webpage, playing a game, and reading from an ebook. Each task was performed twice—once in laptop mode and once in tablet mode—and participants were not told upfront about the glitch. Performing the tasks twice exposed participants to the conditions when the glitch

would be perceivable in tablet mode and gave each participant a baseline against which to compare. At the completion of each task, participants were asked to reflect on the experience and comment on anything they noticed. At the conclusion of the user study, participants were shown the delay outright and asked a final time to reflect on their perception. The user study was executed by an external interviewer reading a script. Prior to the user study, Katrine wrote the comprehensive script for the interviewer to use. This allowed Katrine and I to sit behind a two-way mirror to observe and take notes.

In conjunction with the script, Katrine made a digital spreadsheet that listed the questions and responses in the first row and participants in the first column. As the interviewer guided the participant through the various tasks and responses, Katrine would summarize ideas or jot verbatim excerpts in the corresponding cell. She often explained aloud to me what she was documenting, contextualizing the responses in instances when it was less apparent what was important. As the study progressed and Katrine got a general sense of trends in the responses, she began highlighting individual cells in red to "up-level quotes." These up-leveled responses were selected, she explained, as they identified important ideas found across many participants or identified unique responses that Katrine felt were necessary to guide the team. Unlike interviewing, observing happened in fits and starts. Between responses and as the interviewer explained the next task, Katrine paid less attention and tackled other tasks, such as working on the user study presentation or responding to emails. When a participant responded, Katrine would furiously type. The individual sessions were video recorded. In the event that Katrine or I missed something important, we would jot a note to consult the video.

While the user study might seem to split data collection from analysis, Katrine's technique intermingled these two activities. As she observed, she selected amongst observations based on her knowledge of the project and particular expertise with regards other user studies. She explained this in practical terms: user studies often had a short timeframes for data collection and analysis. As such, she needed ways to speed up the process to return results from the study in a timely manner to have an impact with the engineering and design teams. (Katrine 11.05.2013) These practical terms, however, do not fully explain the intermingling of data collection and analysis. Even more, while her explanation takes the short timeframes for granted, these time constraints seem to be due to an institutional culture that struggles to justify and place UX within the stream of product development. As such, UX design occurs in the margins.

While Katrine explained the note taking as data collection (that is, research rather than design), she later explained in an interview (Katrine 11.05.2013) that it was hard not to consider the implications of these observations.

Creating that partition between [UX research and UX design] is near to impossible. [...] It becomes important to keep the partition because you don't want to pollute [...] the research through your bias as a designer. But at the same time, while you are listening, things get shaped in your head. Things get formed; possibilities are created. Right?! Because you [one as a UX researcher] are also a designer. (Katrine 11.05.2013)

While Katrine was trained as an architect and industrial designer, Katrine's statement referred to something more generalizable than to "hybrid" (Katrine 11.05.2013) professionals, herself included. User experience research in a professional setting is always applied. This means UX research (here, a user study) needs to be communicated to the broader team including designers, engineers, and marketers. As such, UX researchers are not passive communicators of data who simply relay information, but

active in crafting a narrative about the data. In short, UX research is part of UX design, despite its organizational distinction. For Katrine, this crafting of the data started during the user study itself. While it was practical to start earlier given the time constraints, it also embodied how Katrine viewed the relationship of UX researchers to UX designers. As much as research and design are discrete roles, doing UX research requires more than simply setting up scenarios to capture information; it requires knowing how to make that information useful. Katrine continued,

I try to be very clear with myself—although I do have my ideas of what the design should be about or where it should go—that stays out of the interviews because I don't want to pollute the interviews. Right? So I try to ensure that my perspective and vision as a designer doesn't, as much as I can, doesn't influence the interviews. At the same time [...] as that interview gets conducted connections are made in real time. I think from my perspective, I decided that is a [...] positive thing. I think that's is what enables me ultimately to do, what I think is hardest for UX people [to do], whatever that means, which is the translation. (Katrine 11.05.2013)

In the particular instance of the fourth PixelTouch study, Katrine never intervened in the study itself, and saw the distance between interviewing and observing/data collecting as enough to remove bias from her *in situ* analysis. Regardless of when translation begins (before or after the study), Katrine also pointed out that while the UX researcher is the advocate for the user, that user is not without translation and construction. The UX researcher, then, crafts the/a user from the user study data that allows teams to move forward (Wilkie 2010). While Katrine thought of the user study and *in situ* analysis as data collection, it might be better described as a type of informed and trained judgement (Galison and Daston 2007). In this user study, Katrine was training me in how to take notes as much as how to craft a user from the material of observations.

User Study Five: Crafting experience as a decision unit

In an offsite facility, Katrine and I were in the midst of 30 hour-long user interviews for PixelTouch. This was the fifth user study for the software. Planned on a short timeline, the 30 interviews had an aggressive schedule—three 12-hour days and two 6-hour days, including one Saturday. Each day consisted of several hour-long, one-on-one user interviews. The interviews consisted of lengthy explanations of PixelTouch v1 and v2, a walkthrough with a full version of PixelTouch v1, a walkthrough with an interactive demo of PixelTouch v2, and a series of questions to assess the various parts of the software. Between each one-on-one interview, Katrine and I had 30 minutes for break. On the 12-hour days, we did 8 interviews; on the 6-hour days, we did 3 interviews. With set-up, interviews, breaks, interviews, and breakdown, Katrine and I worked close to 50 hours on just user interviews. This occurred in addition to the work week.

During lunch on the third 12-hour day, Katrine and I were exhausted from the schedule. Katrine's voice had grown hoarse from saying the same hour-long script close to 20 times at this point. On the other hand, I suffered from the malaise and eyestrain headache of taking notes in an isolated and dimly-lit room behind a two-way mirror. As Katrine walked interviewees through the various features of PixelTouch v1 and v2, I typed notes, color-coded responses, and entered answers to various questions into a spreadsheet. During this break, we devoured our food while talking and joking about things unrelated to software. While the PixelTouch project team was close to 10 people, only Katrine and I were present. The software engineers who developed PixelTouch were not there; nor were the marketers who met with OEMs to pitch PixelTouch; not even the design team who spend endless hours designing the various minutiae of PixelTouch from the easing of how icons appeared to the angles of application tabs. While two of the

software engineers came on the first day for two interviews, they did so only to fix a bug in the software that appeared during testing. The user study fell squarely on the user experience researchers on the team.

Katrine insisted on doing the interviews herself rather than hiring an external interviewer. While we wrote a script for the user study for Katrine to use and she followed it very closely, she explained that following the script was more for coordinating with me behind the two-way mirror than it was for proper execution of the interview itself. The various sections of the user study matched a spreadsheet, which broke down the various sections and questions into columns. By following a fixed format, she and I would be able to more easily analyze the responses. The script, she found, was often followed *too* closely by an external interviewer, who failed to probe opportune comments. Where the script standardized the interviews, the script also removed the potential for unexpected responses. These unexpected responses may be precisely what the PixelTouch team needed to bring the project above the base. Doing the interviews herself, Katrine was able to continue questioning particularly interesting comments beyond what the script outlined. In search of these subtle comments, Katrine suffered through 30 repetitions of the script.

Each user interview began by explaining PixelTouch v1. Katrine explained the features of PixelTouch v1 as interviewees used a live demo of the software loaded onto the predecessor to Grim called Fable. Following the first section, Katrine asked questions about preferences and overall impression. Unlike the fourth user study, interviewees were asked to perform a few tasks without repetition and were asked to speak aloud about as they were doing so. In the next section, Katrine explained PixelTouch v2, which had

some added functionality and several particular features. These features composed their own sections, and questions were asked about each one. PixelTouch v2 was not a developed software. Unlike the PixelTouch v1 software, to show these features Katrine commissioned an interactive prototype of PixelTouch v2. This mock-up required the interviewee to follow instructions closely since the prototype did not respond like a full developed software. This prototype was what Katrine referred to as a "collateral."

Collateral and its damage

To plan these interviews took a variety of steps, and Katrine was very familiar with these steps. One of her main responsibilities was doing user studies, often at a scale far larger than the present interviews. Within HCI and UX literature, user studies are a common topic, and each year new methods of engaging users are introduced and old methods are used in case studies. What is missing from these accounts of user studies are the logistics of actually doing a user study—that is, the work of setting up and performing a user study. This tacit knowledge "that no one is spelling out" (Katrine 11.15.2013) constituted a bulk of the work of the user study. To actually run a user study, Katrine explained, she had to book an offsite facility, hire an agency to recruit users according to LTC's demographics, request funding, and work with a design team to gather what should be tested. In user studies where the technology being tested did not exist, as in this PixelTouch user study, Katrine needed to work with a team to produce a *collateral*.

The PixelTouch user study required the production of a collateral for PixelTouch v2. This prototype, as it turned out, was an issue.

When we worked with [the PixelTouch design team] for testing [PixelTouch v2]...that is a classic example where they did it the way that they wanted, [...] and it was not done in a way that enabled testing. Was it a bad interface? No. Did it work well if you want to demo stuff? Yes. Is it

useful for testing? No. And so that means there are really two different products. And so the collateral you need to build for UX testing is a different thing. And so that means you as the UX tester, if you've got your own protocol, you've got to give someone the brief of what you need. What actually constitutes a good collateral of what needs to be tested. [...] And how are you supposed to tell to a designer this is how this collateral needs to look like for me to be able to test. That means you need to have in your mind a vision of what the best thing is. You need to have that. You need to have some design capability. Or you have a partner that is so good at understanding your job that you don't need to explain it, and they do it. Whatever is the case, you need to have the capability somewhere. (Katrine 11.15.2013)

In particular, the prototype of PixelTouch v2 required the participants to follow instructions very closely. Participants had to hold the device in a particular way and were unable to touch the screen in according to the visual affordances of the display. Areas that looked like tabs, buttons, or interactive elements were largely not since the visual display and the interactive components were not real. Additionally, while the actual PixelTouch software used and controlled sensors on the device, the prototype did not. As such, having participants interact with the demo was stressful for Katrine as she had to reset the walkthrough frequently when a user made an unexpected touch or gesture.

More than just the PixelTouch v2 collateral, the user study had other issues. In order to do the user interviews, a version of PixelTouch v1 and the prototype of PixelTouch v2 were loaded onto Fable. Fable was a buggy and clunky device that was never really intended to be used as much as it had. As software engineers for PixelTouch, the project's manager, and numerous other employees commented, Fable was only truly meant to power-on at an electronics conference a year ago. Since then, Fable had been through several rounds of user tests for PixelTouch and other projects, and made the rounds at other electronics conferences, demos, and internal tests. Fable demonstrated and embodied a new type of detachable laptop, and so Fable was the only device ever

made that required and could demonstrate PixelTouch. As such, Fable became a vital tool to the PixelTouch team, as well as other development teams that needed to test the next generation of software and hardware. Only two Fable units had ever been made. Every demo, test, and conference required one or both of the units, and so the two Fables were passed off, and transported over and over again, loaded with early versions of buggy software, and continually wiped, reinstalled, and passed off. This constant rotation contributed to these two units' degradation.

The present set of user interviews was no different. We procured both units—one to use and one as a backup (Katrine worried that one might fail)—one week prior to the interviews. The latest version of PixelTouch v1 was added to the Fable machines in a short window. The day prior to the user studies, I was charged with collecting the units from the design team who had worked on an interactive Flash demo of PixelTouch v2 to be used for the user interviews. That night, I placed the only two Fable units in existence in a backpack and rode my bike gingerly home.

The circumstances surrounding Fable meant that the issues related to the collateral were not discovered until the user study began. While the team wanted the user study to prove that the PixelTouch was vital to the Touch Experience, the collateral made this proof difficult. While users could interact with the interface, the collateral could not simulate the experience of PixelTouch or the Touch Experience since the user was not allowed to hold the device as they would naturally. While the bezel worked for some gestures, the prototype of how PixelTouch v2 worked was displayed within the active area of the screen. To use the prototype, the bezel sensors needed to be turned off. Even more, the simulated bezel could not be held since the prototype did not account for the

other actions allowable on a touchscreen device—swipe, clicks, and context menus interfered with the walk-through. Amidst all of this frustration, the user study took place.

Preparing and Positioning

On the Wednesday after the user studies, Charles, the head marketer for PixelTouch, practiced the presentation he would give to Rohit before the PixelTouch team. In preparation for the final presentation, I was asked to edit videos of the user study to communicate key points and supplement the PowerPoint presentation. One video showed participants reflecting on the value of the PixelTouch v1. Participants explained that the software made detachable laptops easy to use. Another video showed participants explaining their overall opinion of PixelTouch v2. Where the responses in the first video communicated the utility of the software, this video showed participants commenting how desirable PixelTouch v2 was for detachable laptops, assuming it worked as they expected. Beyond working, PixelTouch v2 became a selling point. In other videos, users were shown doing particular tasks with PixelTouch v2 to further explain what was so desirable.

At the beginning of the practice presentation, Charles commented that Rohit will likely ask "'Why are we even here?! I thought PixelTouch was ZBB'ed.'" (field notes, 10.16.2013, PCT Staff) Charles continued that he will address this concern by explaining that the PixelTouch team felt that the decision to ZBB PixelTouch was under-informed. The lack of information about what PixelTouch was led Rohit to make his decision. Charles explained that the presentation aimed to both fully inform Rohit of the PixelTouch software and demonstrate why it should be brought "*above ZBB.*" (field notes, 10.16.2013, PCT Staff) Charles moved into the slides. The first slide was an

executive summary that outlined the main points of why PixelTouch should receive funding. Charles read the slide aloud:

[Executive Summary slide]

*PixelTouch accelerates [...] sales through:
[More responsive displays]
Intuitive, easy [application] switching
Customizable [...] controls (tablet mode)
No BOM Cost
OEM Branding & Differentiation
[Enables LTC experience]
Sold to [one OEM] and high confidence with two more OEMs
Resource feasible plan and alternatives*

(field notes, 10.16.2013, PCT Staff)

*
**

The second slide shows the cumulative results of user studies related to PixelTouch v1. In total, 144 participants (the slide listed these participants as users) had been interviewed. The slide was cluttered with five word clouds and five bar graphs. Each graph corresponded to a single user study and showed how users rated of PixelTouch v1. Accompanying each graph was a word cloud. Most visible were terms like useful, necessary, important, and helpful. Charles talked over the slide, explaining that the user studies showed that users thought of PixelTouch v1 an "enabling technology" (field notes, 10.16.2013, PCT Staff) for this new genre of devices. What he meant by enabling was that PixelTouch v1 was vital for using detachable laptops. The third slide focused on PixelTouch v2. Instead of a cluttered slide, a single word cloud, bar graph, and key points from the recent user study were shown; this was the first and only user study of PixelTouch v2. The graph showed many favorable responses and the word cloud contained words such as exciting, desirable, and must-have. Charles talked through the key points, explaining that users found PixelTouch v2 to be more than just a

convenience, but also a desired feature. Charles emphasized that the data showed that PixelTouch was something users wanted.

At this point Katrine asked to show the videos. Charles agreed and mentioned that he needed to test how to stream the videos over the meeting software. Charles explained that another executive, Arun, would be calling in for the first half of the hour-long meeting. Arun was an executive at the same level as Rohit and was an advocate of user experience. Charles explained that Rohit was in charge of the engineering organization, while Arun was from marketing. While not responsible for user experience within his group or within the organization in general, Arun fancied himself an advocate for UX. Arun could advocate for PixelTouch with Rohit. Charles explained that showing the user studies and videos might be unconvincing for Rohit, who cared about headcount and cost, but would be very convincing for Arun. Since Arun could only join for half of the meeting, Charles wanted to put the user studies at the beginning to enlist Arun's help.

The practice presentation ended at this point as the group needed to move on to other business.

Above ZBB

I was not invited to the meeting in RF3; I received a recap during the PCT staff meeting the following week. Charles explained that the presentation was successful at returning PixelTouch to a budgeted project. I assumed videos and user studies would play an important role, but Charles explained otherwise. Rather than present on the perspective of the users, the "focus of the presentation was head count [and] budget." (field notes, 10.23.2013, PCT staff) While Charles changed the presentation the day prior to his meeting with Rohit to focus on the pressing logistical concerns, he did not

completely abandon the user study data and videos until the meeting itself. As he recounted, before Charles could begin, Rohit commented, "of course, you're going to tell me users want your feature. But how do we do it?" Charles claimed that Rohit wanted "TAM" (Total Addressable or Available Market) (field notes, 10.23.2013, PCT staff) rather than a compelling story of why the PixelTouch was important or desirable. The meeting concluded with Rohit suggesting outsourcing software development, since, as Charles put it, "dollars are easier to shut off than people" and LTC could support the project with "money rather than heads." (field notes, 10.23.2013, PCT staff)

As Charles finished his recap of the PixelTouch meeting, the lead UX designer, Hiram, and the manager of PCT, Martin, conjectured about how PixelTouch was ZBBed in the first place. Hiram claimed that PixelTouch fell victim to an overly cautious executive staff. Since the PixelTouch software had specific hardware requirements that were still in the early phases of development, the project was ZBBed due to a "chicken and egg problem." (field notes, 10.23.2013, PCT staff) The executives at LTC did not want to be the first company to suggest devices to OEMs that ODMs were unwilling or incapable of making. Martin disagreed. The cautiousness of the executives at LTC had little bearing on the decision since to understand the value of PixelTouch meant that the executive in charge—namely, Rohit—had to understand the PixelTouch existed within an ecology of devices. For Martin, PixelTouch was software for hardware that did not exist, and the cancellation was due to Rohit's naïveté that the hardware was being developed simultaneously within LTC. In this regard, PixelTouch was cancelled, as Charles commented, out of a lack of effective management communication. While Hiram

disagreed with Martin and Charles on the reasoning, they all agreed that the underlying problem stemmed from the inadequacy of the decision unit.

Discussion: Neutral Budgets and Embodying Burden

The account of PixelTouch provides insights into the relationship amongst the strategic activities of UX design and other strategic activities at LTC through their intersection in decisions and decision-making. In a general way, the account illustrates the non-linearity the work of implementing and executing a strategic design initiative. Reinstating PixelTouch was far from direct—an attribute of all work certainly. With particular regard to UX design, the complex tactics of navigating decision-makers, gathering evidence, and arguing for outcomes all came under the banner of representing the needs and desires of users. While the project itself, and its relation to the Touch Experience, illustrated a fundamental discord due to user experience design, the particular lived realities of working to achieve certain ends (i.e. reversing a decision) represented other aspects of how UX design functioned strategically. The following discussions explore both aspects of the account.

Neutral Budgeting?

Mentions of budget are rare within design scholarship. When budget is mentioned, it remains a passive and obscured resource. Budget, like production schedules, serves as the backdrop for accounts of design—budgets impact designing, yet budgeting appears outside of the purview of designing itself. For example, in an account of the design of medical technology, sociologist Alex Wilkie weighs schedule and budgetary constraints equally as given resources that guide decisions related to UX work. Wilkie briefly mentions budget, explaining that "contact with patients was limited to the

interviews" (Wilkie 2010) because limited budget meant less time researching potential users. Budget, then, is a *given* constraint to designers. Even more, where budget—that is, monetary resources—is mentioned by Wilkie, budgeting—that is, the process of deciding on such allocations—is not. Certainly, Wilkie is not alone in separating budgeting from design (Telier 2011; Buxton 2007; R. Boland and Collopy 2004); however, more often budgeting and budget are simply absent from discussions of design and strategic design initiatives altogether.

In a study of design decision-making, Christiaans and Almendra make a passing remark that might explain why budget is frequently overlooked. Studies of design decision-making are typically conducted within controlled settings as "experiments." (Christiaans and Almendra 2010) As such, these studies of designing often bracket budgeting and budgets, scheduling and schedules, and other logistical factors by removing them from the assigned and studied tasks. Christiaans and Almendra, for example, comparatively analyze videos and transcripts of a design task related to the "conceptual design of a software system." (Christiaans and Almendra 2010) While the design task (e.g. the experiment) takes place in a professional setting by professional designers, the set-up of the task includes a distinction between design (i.e. strategic, conceptual, and planful) and development (i.e. tactical, logistical, and vernacular). From the outset, this study assumes that the development constraints are fixed for, or, at least, given to designers. By omission, budget bears on design decisions, but is not part of these decisions, *per se*. While one might argue that logistics like budgeting rightfully fall into the background, such a claim finds support in such controlled studies—that is, budget is simply not mentioned as part of the design task or as a material to manipulate—only

furthering the point. While Christiaans and Almendra only mention the limitations of controlled studies (i.e. removed from the context of work), the assumption that designers abide by the rigors and logistics of work without question (or question this background under a different name, such as management) highlights a core dilemma about design serving strategic ends—*to what extent is design metaphorically or symbolically strategic?* Most striking about the obscurity of budgeting within design scholarship is more prominent mention of the relation to design and profitability, often under the guise of ideas like differentiation (see Chapter 6 for a longer discussion of the term).

The account of PixelTouch presents, then, maybe an atypical account of the impact of budgeting on design, though not an atypical relationship between the activities. As already explained, ZBB requires a proactive and detail-oriented project team to justify its activities for the upcoming year. Teams, like the PixelTouch team, justify their project on its own since this style of budgeting required decisions to be made on a comparative decision unit. Historically, and reinforced by Rohit, the decision unit was the componentized project. For the PixelTouch team, this unit poorly represented the value and necessity of their work because the unit poorly represented the techno-symbolic relationship amongst projects in the Touch Experience. While ZBB exhibited particular idiosyncrasies with regards to UX design, the account raises an important concern about the performed neutrality of other activities, such as budgeting or scheduling practices. The same way that considering user experience as a product demands new working procedures within development teams (Chapter 5) or institutional organizations (Chapter 6), the uneasy relationship between UX design and ZBB highlights a broader problem of

the extent to which design is taken seriously as a strategic approach to the activities of a company.

Reflecting on this broader problem with regards to new product development (a strategic design initiative), Sabine Junginger writes,

By treating product development as a phase, the organization stabilizes and reinforces existing assumptions under which product development then has to operate. Similarly, product development as a cost turns the development activities into a budget item that can either be cut or raised. In this sense, product development only can affect the organization in financial terms. Again, the organization makes every effort to retain its existing framework rather than engaging in an inquiry about its relevance or feasibility. Finally, the idea of product development as process is problematic, since it easily misleads people into thinking about product development as some kind of a mechanism. A process typically suggests a predetermined, or at least a predictable, path. In its extreme, it is akin to a formula. For a process to work, one needs to decide the variables and factors that go into producing the desired outcome. This is in direct opposition to the "Fuzzy Front End" that marks new product development, and in which neither all variables nor all factors can be known or decided upon in the beginning. Organizations that liken product development to a "process" are prone to focus on process improvements. Achievements in this area include savings in time and cost but, unless the organization itself can change in this "process," the abilities of product development to deliver the desired outcomes are limited to innovations of a technical nature. (Junginger 2008)

The final line of this excerpt from Junginger seems to resonate throughout all of the empirical accounts, yet the present account illustrates an important elaboration.

Underlying strategic design initiatives is an assumption of change. While this change includes new products, change also requires new organizational elements, such as oversight bodies like the UX Council, and procedural changes, such as rethinking product development itself. The implication in Junginger's writing is one of scope: *to what extent are strategic design initiatives truly considered a company strategy?* With regards to PixelTouch, UX design and ZBB conflicted through their co-existence as strategic

initiatives. This conflict does not represent, however, the core of the problem of the underlying the cancellation and reinstatement. Instead, like Junginger probes, the core problem dealt with insufficient understanding of how these two strategies interact at the level of company. In other words, a core issue illustrated by the cancellation PixelTouch is the relationship and prioritization of corporate strategies, an issue deeply related to the translation of strategies from daily work at various levels.

In article titled "Moving Design from Metaphor to Management Practice," Liedtka and Parmar suggest that the reason design rarely changes management activities is that managers do not change how they do decision-making. They explain that,

The traditional decision-making processes that are taught involve a linear method of thinking in which the problem is defined (and that definition is accepted as "true"), a comprehensive range of alternative solutions is generated and evaluated, and the optimal one is selected. While this decision process can be efficient, it is less useful in complex and ambiguous situations, where problem definition is an open and critical question. In contrast, a hypothesis-driven approach is iterative in nature, skeptical as to the definition of the problem itself, opportunistic in its generation of solutions, and almost obsessed with optionality and experimentation, rather than a single-solution approach borne of analysis. (Liedtka and Parmar 2012)

For the authors, in order for design to function as a strategic activity, decision-making needs to mirror design. In this excerpt, Liedtka and Parmar suggest that decision-making activities adopt a stance toward uncertainty and optionality very much akin to a designerly approach. (Cross 1992) By recasting a core activity of management (i.e. corporate-level, as opposed to product-level, decision-making), managers can better support and embody strategic design initiatives that ideally tend toward speculation and unfamiliar product categories. While Liedtka and Parmar attempt to find a way to support strategic design initiatives at the managerial level, they equivocate supporting design with

the activity of design. Liedtka and Parmar are not alone in their suggestion. (R. Boland and Collopy 2004; Buchanan 2004) While designing holds value for managers as a strategic approach, recommending less deterministic approaches to decision-making assumes that decision-making lacks materiality. In the case of PixelTouch, Rohit exhibited many "stereotypical behaviors" (R. Boland and Collopy 2004), such as diverting to head count and TAM. The team tried to argue that PixelTouch went beyond these justifications for funding. As such and important to understanding the account was the materiality of decision-making, namely, the decision unit and the decision package (i.e. the presentation). Regardless of the predilections of Rohit, this materiality limited how decisions could be made in a fundamental way.

Rather than change the procedure of decision-making, the account of PixelTouch points to a potentially different immediate change—change the materiality of decision-making. For UX design to find support within the current budgeting strategy (ZBB), the decision unit needed to shift. This recommendation does not presume managers *can* act like designers (nor try to refute prevailing managing-as-designing literature). Instead, the need for a new decision unit at LTC points out that the reason strategic design initiatives often lack force within a company is because they are conceptualized as purely attitudinal or patterned (R. Boland and Collopy 2004), that is, as predominantly cognitive. Attention to the materiality of decision-making reveals that strategic initiatives—design, budget, or otherwise—are diffuse and overlap, exerting force within a company and on each other in their sociomaterial assemblage.

Embodied Burden

The vast majority of the account does not report on decision-making, but instead reports on evidence gathering, political strategizing, and tactical attempts to produce a certain decision. In other words, the account focuses on the work of responding to and preparing for an explicit moment of strategic decision-making. This work focused on achieving the outcome of reinstating the PixelTouch project. While other efforts occurred simultaneously,³⁵ a primary strategy consisted of conducting a final user study. The user study gathered more data on the overwhelming positive response of users to both PixelTouch v1 and, for the first time, v2. The user study required a great deal of effort from preparation and execution to analysis and presentation. The tactics themselves are worth considering in terms of efficacy—that is, *did a/this user study lead to the reversal of the decision by Rohit?* However, focusing exclusively on the efficacy of the user study conflates outcome and process, and misses important aspects of doing user experience design work. In particular, discussing the efficacy of a strategy ignores the performed cultural values that are embodied in the activities of engaging in a user study and its place within decision-making as a progressive and distributed process. The efficacy of the user study (something that will not be substantiated or rebutted here) presents a jumping off point for this other discussion.

To begin, the team claimed that performing the user study would be vital to the reinstating PixelTouch, that is, it would contribute efficaciously to a decision outcome. If this claim is taken at face value, the account and the outcome seem to disagree. Just prior to the meeting, Charles changed the presentation to deemphasize the perspectives and opinions of users. Instead, the presentation emphasized the logistics of running the

³⁵Other activities included refinement of the PixelTouch software and continued design of the user interaction with the software. While I had a glimpse of the latter work, I did not observe the former save for the updated software. That is to say, I did not have access to this work.

PixelTouch project—internal staffing and alternative funding and development schemes (e.g. outsourcing)—and more traditional persuasion—the signed contract with an OEM, the lack of BOM cost, and the necessity of the project to support other ongoing efforts, all listed in the executive summary slide. This final point about the necessity of the project in light of other effort seems like a weak shadow of user experience, possibly an attempt to render UX as a decision unit in unfitting circumstances. Regardless of the opinion of users and the intention of leveraging PixelTouch's position amongst projects, the Touch Experience required PixelTouch to exist in an *a priori* and structural sense, meaning that the user study provided no new insight into this particular fact. Based on the style of argumentation, one might question the validity of the claim that the user study was important as its particular contribution did not make a strong appearance in the final presentation.

Prior to the decision to deemphasize the user study data, the presentation also challenges claims that the user study was efficacious in an explicit way. By averaging all the studies for PixelTouch v1 (e.g. showing continued positive feedback by collecting all the study data on one slide), the final study only contributed to an ongoing narrative, making the final study neither tactically vital nor explicitly different. Even more, by presenting PixelTouch v2 in the same format (i.e. repeating the slide formatting), the team was emphasizing a teleology of desire—PixelTouch v2, like PixelTouch v1, was well-received. As much as this second batch of data came directly from the fifth user study, a change in user reception was never the issue with regards to canceling the project; the team knew this all along. Lastly, even in light of the discrepancy between Rohit and the team with regards to the decision unit (i.e. the project versus the user

experience, respectively), offering positive feedback neither explained the intricacies of the user experience nor aimed to address Rohit's concerns about the total available market (i.e. the potential return on investment). As such, one might assume the team inflated the efficacy, and so the importance, of the user study.

With all of these points in mind, one might begin to question both how vital *this* user study was to Rohit's decision and how vital *any* user studies could be to matters of canceled projects. These questions, however, assume that the vitality of the user study to the reinstatement decision can only be judged in terms of the outcome of the decision and the tactics deployed in that outcome. Such a judgement assumes that the value of user studies is precisely epistemic, and only vital when this knowledge is deployed to make a decision. However, the value of the user study goes beyond its stated ends and explicit deployment. To understand the importance of the user study, we must move beyond the surface claims that the user study served an outcome (i.e. reinstatement) by way of a process (i.e. decision-making). Instead, another way to understand the importance of user study in the process of decision-making is through the construction of a cultural narrative around the importance of the user study to the reinstatement.

The claim that the user study was vital to reinstatement represents a cultural narrative around what the team believed to be their *responsibility* with regards to the user. To frame this claim, I want to borrow from a study done by HCI scholar Erin Friess. In a study of the use of personas in the design process, Friess reveals that personas are used rather infrequently during decision-making. (Friess 2012) Despite the fact that personas consume a considerable amount of resources to produce and designers claim they are vital to coordination and decision-making, personas are rarely invoked in explicit terms

when making decisions. Even more, rarely are personas referenced by those not involved in their construction. In their absence, Friess points out that designers invoke more general and indirect reference to "the user," seemingly personal opinions (i.e. "I" statements), or storytelling to make decisions. For the designers involved in their creation, the personas underlie these linguistic approaches—a general user that adheres to tropes of the persona; a "personal" opinion informed by the details of the persona; a story that aligns with the description of the persona. Friess explains that "[t]hose designers who developed the personas were treated by the other team members as *custodians* of the personas and were the team's resource for clarifications about what a persona would or would not do." (Friess 2012; emphasis added) While the circumstances are considerably different for the PixelTouch team, the notion of custodianship provides a way to understand why the team felt the user study was so important.

In the context of user experience design, custodianship means more than just being tasked with representing the user. As Katrine put it,

When the time comes [to make important decisions], it's easy to drop UX. It is easy, and, in fact, in some cases, it's comfortable [...] [I]f you are a good UX person, meaning that you really are true to your ethical responsibility toward the user, [then] when the time comes, you're going to be a pain in the butt. You know, you're going to be the one that is going to say "No, this is not good enough. No." And you're going to be the one that is going to be hated by the entire team because you're slowing them down. (Katrine 11.15.2013)

For Katrine, "being a good UX person" equates precisely to a notion of custodianship—being responsible for another (i.e. the user, whether specific or not) in circumstances that they are affected but not present. Shepherding the insights and perspectives garnered from users—that is, custodianship—is an ethical imperative and a demand of the job that goes beyond simply making this information known. Katrine

explains one way in which this demand takes place: being "a pain in the butt," or doggedly pursuing outcomes and decisions that represent what users need and desire. Katrine explains custodianship as holding teams accountable to UX design through direct and persistent attention to the user-centered data and the implication of that data with regards to engineering. Friess' insights about personas focus on the decision-making activity itself in the context of HCI design teams; the present account extends these ideas to show how this custodianship is both embedded in and embodied by the processes that underlie user experience design as a distributed activity across multi-disciplinary teams.

Custodianship was observable at two scales. The first scale was that of the individual UX professional, here being (primarily) Katrine. Katrine's annoyance with the collaterals expressed her desire to gather worthwhile data, meaning data that could encapsulate the opinions and desires of users. Her annoyance also expressed a self-inflicted pressure to illustrate the importance of the study to participants (that is, at the moment of doing the user study) by presenting high quality materials. Becoming a custodian of users meant both sacrificing physically to perform user studies (e.g. the long schedule for the final user study) along with making sure those insights find a place within the final result (i.e. being dogged). With regards to the former point, the account offers a counterpoint to Boland and Collopy's claim that a design attitude "does not have to cost more" (R. Boland and Collopy 2004) than existing approaches. Even if this cost is not a cost incurred by the manager or a monetary cost on the company, the cost of encouraging new strategies might be represented in borrowed time or overtaxed employees. This embodied burden conflates work and personal identities, an idea Melissa Gregg characterizes as "work's intimacy." (Gregg 2011)

From the notion of custodianship, the last-minute change to the presentation offers a second scale. As Charles explained, the presentation focused on the logistics of staffing and funding the project rather than the value PixelTouch brought to the end-user. This change meant that the user study data—a depiction of end-user value—was moved from the early slides to the back-up section—a collection of slides placed after the final slide and used in the event that more support or evidence was needed during the presentation. In the case of PixelTouch, these particular slides were not used. Instead of being a denial of the importance of UX, Charles and the PixelTouch team affirmed a commitment to the user by working within the dissymmetry of power ZBB enforced. With the "burden of proof" (Pyhrr 1973) falling on the team, tailoring the presentation to achieve the outcome they desired, namely reinstating PixelTouch, meant that Rohit's approval was necessary. As such, to achieve an outcome like reinstatement, they needed to leverage existing constraints to their advantage, such as Rohit's particular bias toward traditionally accepted measurements of worth. As much as the entire process of reinstating speaks to a group sense of custodianship, removing the user studies and entertaining Rohit's suggestion to outsource the work suggests a pragmatic aspect of custodianship. In order to have the project continue, the team adopted an approach that fit within Rohit's expectations. By doing so, the team acted to preserve the project in order uphold their position as custodians to users. In design terms, the team created a depiction—a presentation as a *thing* (Telier 2011)—that embodied custodial tendencies of UX design by removing the user altogether.

Given these two scales of custodianship—individual and distributed—the importance of the user study reflects an internal affirmation of the teams commitment to

user experience as a metaphor and practice of working. While the team justified their work in terms of the project's larger trajectory (i.e. necessary for other projects), performing the user study served more to galvanize the team as custodians of the user. The importance of the user study, then, was accomplished by being a labor intensive part of the process toward reinstatement.



The tension underlying these tactics and their intended outcome reveals the materiality and culture mutually arise in the form of attitudes, predispositions, processes, and tasks. Another example related to decision-making highlights a final point. In an article focusing on creating organizations ready for rapid change, Miles and Scaringella write,

After an internal company analysis revealed six major reasons IBM routinely missed new technology and market opportunities, the firm developed the Emerging Business Organization (EBO) initiative in 2000. The elaborate EBO process systematically explores, creates, and tests new business units that are then either grown or terminated. In less than ten years, 25 EBOs were launched. Three failed and were closed, but the remaining 22 now produce more than 15% of IBM's revenue. (Miles and Scaringella 2012)

Within the context of the article, the excerpt serves as supporting evidence of more modular and diverse organizational structures to accommodate a variety of options. Teams are encouraged to experiment in order to address emerging focuses. Striking about this excerpt is the phrase "[t]hree failed and were closed." While a corporation such as IBM needs to prioritize decisions, considering the intended user (that is, the human scale rather than the corporate scale) exposes a fundamental incommensurability of talking of design and the user while also seeing these as capital and markets. In other words, extending the approaches of design to the scale of a corporation or organization exposes a

core tension between the commitments and metrics of evaluating success at the company-scale and the commitments and metrics of evaluating success at the human-(or user-)scale. For the project team, PixelTouch was important both in terms of the technical function and what it potentially offered to end-users. For LTC and its customers, the value of PixelTouch was return on monetary investment. The different values between these scales raises concerns about what it means for a company to adopt designing as an operating principle, and how much that those new procedures demand new ethics. The conclusion introduces a discussion of design culture(s) (Nelson and Stolterman 2003; Deserti and Rizzo 2014) to more adequately address differences in values. As an open question, this final point raises the ethical question of *at the corporate scale, what happens to the human and individual perspective so central to design?*

CHAPTER 8

CONCLUSION: RECONSTITUTING UX

The work documented and discussed here presents a rich perspective on the already rich field of user experience design. As a seemingly endless fractal of detail, user experience design argues that the goals of human-centered design stem from and extend to the various minutiae and macrocosms of products. Accordingly, the design of a product is a vast array of activities that encounter and encompass the needs, wants, and desires of users. The present research expands on these ideas to understand how the contexts of work comes to embody and produce (or claim to) such outcomes.

The driving force behind this work is a bifurcated lens: what work counts as design and what design counts as work. This lens splits assumption from activity and intention from execution. In doing so, user experience design becomes an object of study beyond its agenda, and is located and situated through its performance. The goal has been to unearth accounts that provide insight into the ways design is materialized and acculturated into a setting.

To study the overlap and gaps between designing and working, the case study focused on LTC, an ingredient company for computational technologies. LTC had a long history of engineering, yet recently introduced designerly approaches to product development and toward corporate strategy. This strategic design initiative focused on user experience design as a way to coordinate, drive, and redirect what LTC envisioned as the future of computing. User experience design impacted teams, individuals, organizations, and procedures that, regardless of some strategic vision, existed and composed what it meant to work at LTC. Then in many ways, LTC offered an

idiosyncratic place to study design and designing. The long history of engineering-led activities made designerly approaches especially alien and being an ingredient company made the humanistic focus of UX design a rough fit. However, LTC offered a particularly intriguing location to study design work because such work was still being negotiated. The lack of fixture exposed the edges of debates around legitimacy as much as strategy.

The goal of the case study, and the underlying agenda of this dual focus, has been to unpack the materiality and situatedness of designing, that is, design practice. In and amongst the materials of inquiry and inquiry of materials are embodiments and expressions of the various doings and sayings called design. The case study argued that rendering design (the field and the idea) into designing (the activity and the processes) relies on local cultures of legitimating contributions to work. The particular environment of doing design impacts what designing is and is not. As may be self-evident, not all so-called designing is work and not all working is designing at LTC. The self-evidence of this statement does not provide an explanation of the particulars. Even more, what constitutes design work also constitutes how a local environment comes to embody notions of what design work can do. In the case of LTC (and generally with strategic design initiatives), design claims to offer an efficacious way to innovate. The case study has not purported to understand this leap of faith to innovation, but offers language and attention to the more foundational element—before designing can innovate, designing must occur—so, what are the boundaries of designing?

As much as the case study began from observation, the present research investigates notions of materiality and situatedness within design scholarship and specifically design studies and human-computer interaction. Chapter 2 outlined a handful

of stakes to mark the territory of inquiry. From the concept of design-as-proposal, user experience design is understood as the processes of integrating, relating, and configuring the many pieces of a project. Furthermore, designing as an activity extends this notion of design-as-proposal by exploring the ways designing occurs across the activities of a group (Bucciarelli 1996) and through the available resources. (Schön 1983; Telier 2011; E. S. Goodman 2013)

Following from this concept of design, Chapter 2 turns to the topic of user experience. As a field, user experience stems from the increased abstraction and dematerialization of the design task. Moles argues that design produces environments around products rather than products themselves. (A. Moles 1985) As such, the products of design are the conditions enabled by a designed artifact. The shifting from object to function to environment has led contemporary design scholars to theorize the design of such holistic and comprehensive settings. User experience provides a concept for designers to consider the intertwined, holistic, and contextual aspects of a product to encapsulate this project.

Lastly, Chapter 2 introduces the idea of a strategic design initiative. The core premise of strategic design initiatives is that designing offers a way to approach corporate strategy. At LTC, UX functioned in this manner, introduced to redirect the company through bottom-up changes to products. These initiatives, while prolific in the contemporary moment, are poorly theorized in terms of daily work activities. As such, studying user experience design at LTC provided a way to study a strategic design initiative. More importantly, the contested nature of the initiative at LTC served as fertile

ground to unpack design work, especially with regards to forgotten, overlooked, or altogether missing activities that provide a basis for doing user experience design.

The first empirical chapter traced the way a project team dealt with user experience design. While the team was commissioned to develop a project that focused on user experience, differing concepts of holism highlighted confusion about designing for user experience. Amongst the silent design (Gorb and Dumas 1987) tasks, the work of getting teams to work together flagged. As coordination amongst component groups had occurred to some degree in the past, working together tended to be a term applied to the technical components. While user experience demanded that various components worked together, these components needed to do so in a particular way. In turn, teams needed to work together to figure out how to ensure the character of the whole was maintained. However, teams were unsure what the concept of holism entailed. In short, what did *working together* require of the teams? On one side, holism meant indelible, and so working together meant working as specified in the requirements documents. On the other side, holism meant relational, and so working together meant working within the bounds of specified requirements documents. Where the former notion of *the whole built in mind* left no room for teams to negotiate, the latter notion of *building with the whole in mind* required interpretation of the requirements documents that teams were unable to perform. As such, the interpretation and translation of the UX design requirements became a type of support work. While the project was cancelled because of stalled production, the latter tactics point to understanding the difference between UX design (i.e. the requirement documents) and UX design work (i.e. translating the requirements documents).

The second empirical account traced the process of establishing the UX Council. The Council was created to institutionalize standards around user experience design within PCT. While UX had a great deal of attention, the annual report revealed that, unsurprisingly to many, UX design lacked coordination and standards. In light of the historic problems of appointing people to positions, the Council sought to bring standards to the outcomes of UX design and to the professional activities of UX designing. Along with uninformed appointments, the lack of institutional knowledge around UX design contributed an overall nominal and confused meaning of how UX design impacted product design. Through a process of refinement of who was involved and what the message would be, the Council inserted itself within the product development process. With the goal of strategic design initiatives being product differentiation, institutional mechanisms need to be established that allow for design activities to contribute to product development. Becoming part of the product development process, the Council served the strategic ends of user experience—to impact product development, user experience design needed to become a step within product design and development.

The final empirical account followed the reinstatement of the PixelTouch project. PixelTouch was cancelled, despite being part of a large suite of projects referred to as the Touch Experience. The team wanted to reverse the decision, and decided to run a final user study to demonstrate the worth of the latest version of PixelTouch. While a final user study was presented as vital to reinstating the project, the account contradicts this claim. While the user study helped the team, it could not and did not help argue to reinstate the project. Unpacking the project team's motivations for doing the user study reveals that the importance of the user study was an accomplishment rather than a motivation for its

execution. The team exhibited a sense of custodianship, arguing that the user study was important as a matter of values. The user study and the resulting tactics showed that custodianship—a feature of user experience and other strategic design initiatives—underlies the strategies and tactics of teams. Rather than being understood as an explicit approach to working, being a custodian of the user means taking a pragmatic approach to ethics.

At LTC, to uncover how employees understood their role and the roles of others in technology design is to understand how the assumptions embedded within computational technology become so. More importantly, the contextual use of UX demonstrated tensions between what people claimed about their (or others') work and what they, in fact, *do* on a daily basis. This case study of user experience design work explores what it is to *do* user experience design.

While different in their topic and scale, these empirical accounts of UX design work highlight that a strategic design initiative exists in the work that renders it visible. The activities of negotiating, standardizing, and budgeting user experience brought user experience design into existence. By focusing on the materials and native interpretations of these activities, the case study articulated the divide between UX design as a strategic design initiative and UX designing as work. As such, the case study showed that the strategic design initiative required the combination and mobilization of a variety of resources, infrastructures, people, and money. This tangle of stuff—this *thing* (Telier 2011)—composes contested goals, different cultures of production, and various measures of success. Underlying the object of design, as A. Telier theorize, is a tangle.

Design can thus be viewed as a kind of bricolage, where different materials are brought together, mixed, and configured in various iterations.

Transforming representations and shifting modalities, scales, and materials highlights different aspects of design and is carried out to widen the design space, communicating ideas and narrowing down concepts. The transference from one medium to another without losing essential qualities is often a crucial issue. (Telier 2011)

Within LTC (as with any site), no clear path exists to unravel this tangle. The three accounts aimed to demonstrate that what work counts as design and what design counts as work fail to perfectly overlap. New terms like holism, or procedural adjustments like accountability, or value changes like custodianship are not entirely represented in design work. The tangle that composes designing means that many activities fall outside of the overlap and even fall outside of the domains themselves. The following section explores some theoretical directions that extend the case study beyond its particulars.

Limits And Directions

The limits of a case study are clear. LTC, like any single site, was idiosyncratic and not representative of the/an industry. As explained in Chapter 4, a case study offers a particular line of inquiry into, in this case, strategic design initiatives and the nature of design work: *how did something take place?* and *why did it occur that way?* Without being glib, the present case study of LTC can only truly be accountable to the specific how and why of LTC—extensibility is and was not the concern. However, the how and why of LTC provide reflection points on the nature of design work at large by illustrating that the relationship between designing and working is not one to one. Some designing fails to be applicable to the rhythms, scales, relations, and overall setting of a work environment, and some working fails to be seen as design by the very nature of how design is conceptualized. The case study of LTC, and the particulars of user experience,

highlight the discrepancies between design theory and designing through the lens of practice.

By way of concluding, I want to reflect on a two main threads underlying the case study. The first thread is the notion of design culture in relation to the culture in which designing takes place. The second thread is the discrepancy between the unit of analysis and the unit of design or simply put, the difference between design process, design work, and design outcome when talking about ecosystems of products (alterity, ambience, and wickedness). These two threads set forth concerns that point to future work within design studies. Following these sections is a third section that ground these concerns within the field of digital media and human-computer interaction. This section argues that the case study highlights how digital media and HCI have failed to conceptualize work as anything more than the execution of activity.

These sections follow from a critique that I commonly heard during the research and writing of this case study. The critique goes something like "To what extent are these account nothing more than the nature of work itself?" What individuals mean by this varies, but I want to isolate a particular interpretation of the concern. Certainly when any company introduces something new, there are growing pains. The perceived importance and the size of the initiative impact the extent of those difficulties. Regardless, one might argue that there is nothing new about LTC's struggle to adjust to the introduction of UX. While it is hard to disagree with this logic, the generalizable form of LTC's struggle dampens the particular language that these difficulties took on. Witnessing the daily work of LTC made it apparent that while the difficulties and struggle could have come from a different initiative or used different language, they did not. Many companies from

different industries and with altogether different initiatives and different ends have experienced hard-fought changes as old ways and new ways conflicted. As new domains struggled for legitimacy and as decision-making failed to push the "right" agenda, change came slowly. If we abstract LTC or UX to the scale of a strategic design initiative, or if we abstract the strategic design initiative as an example of any new initiative, then certainly LTC is but one more example of business as usual, albeit under stress. In this regard, LTC is not unique in what it says about work or companies, or even directly about implementing user experience design—difficulties are to be expected. What is important about this case study is what it says when compared in the particular—the coopting of terms from user experience design to explain the conflicts and the language of strategic design initiatives seen in daily activities.

As was outlined in Chapter 2, design scholarship often theorizes design in isolation from a context. Save the select few scholars theorizing design practice, (E. S. Goodman 2013; E. Goodman, Stolterman, and Wakkary 2011; Telier 2011; Nelson and Stolterman 2003) an account of what design(ing) is fails to also be an account where design(ing) is. The latter account is not a matter of where design(ing) should or should not be, but how does the nature of a particular context re-theorize designing. In short, design has well-developed notion of contextualized using (i.e. research focused on the setting of use and user) and an under-developed notion of contextualized designing (i.e. research focused on the setting of design and designer). While some scholarship purports to study designing under the label of design studies and design research, (Baird, Moore, and Jagodzinski 2000; Bertola and Teixeira 2003; Button and Sharrock 2000; Göker 1997; Cross 1982) this scholarship emphasizes the design process and the cognition of

designers. In either case, design becomes a subject to inquire in how design conceptualizes problems, how designers collaborate, or how designers order tasks. These ideas, while important to defining what it is when we talk about design, design all-too-often is an isolated function, whether turned inward or quite literally isolated by being studied in a laboratory setting. While designing might proceed according to these studies, doing design is more interwoven and interleaved than such accounts conceptualize. For example, the various relationships within designing—clients, users, stakeholders, project teams, managers, and companies—are rarely mentioned within design theory and frequently are not constitutive the grounds for of design theory, save in Nelson and Stolterman (2003) and A.Telier (2011). Yet descriptions of design, like Bucciarelli and Schön, show that design can only be understood in terms of such relationships, which are far from ordered or orderly. The consequence is twofold: theoretical frames within design studies that view design as capable of being simulated in experiments (cf. Christiaans and Almendra 2010) and practical accounts of design that neglect important aspects of design as work (the main motivation of the case study of LTC).

Returning to the question at hand, the present case study appears a lot like a study of work because, in fact, it *is* a study of work—design work. Are some of the problems unique to designing or the subject of user experience? Sure, but many (maybe most) are not. What the present case study argues is not that design work is somehow different than other work, but that design scholarship has a poor understanding of work in general and under-theorizes the activity of design. Design scholarship under-theorizes practice. Certainly others have studied design practice. The present research, however, offers a different perspective. Where Goodman studied design practice, she did so in the context

of design firms and design consultancies. (E. S. Goodman 2013) LTC was not that world; LTC was a context less typical (or less typically assumed) in the discussion of design, especially user experience design. As much as LTC was not a design studio, LTC has an important place within the ecosystem of computational products. While design firms and consultancies exist and are prominent, LTC may be a single body that is far larger than any contemporary design firm or consultancy. With companies like IBM snatching up designers and firms to be employed in-house, (Fabricant 2014) studying the ecosystem of companies partaking in aspects of user experience design outside of the design studio is imperative. These contexts in which design takes place alongside a variety of other activities are opportunities to reflect on how the presumed context of design contributes to what we understand as the process of design. Through the differences between theorizing and observing design, we are able to probe at questions about the relations between context and process, that is, design practice. Design work, on the other hand, offers a lens to unpack practice and de-scribe (as opposed to pre-scribe) the expressions and boundaries of design practice.

Design Culture And A Culture Of Designing

Without question, the concept of design that grounds the accounts at LTC was not necessarily shared by all of the employees involved in user experience design. As a wide array of activities and values, the research argues that user experience design is distributed in and across teams, sometimes executed by an individual and sometimes executed in a procedure. Before exploring how this distribution impacts the field of HCI (discussed in *Computationality At Work*), this section explores the coherence of the term design within the discussion of strategic design initiatives.

Critical of strategic design initiatives (and design thinking in particular), Deserti and Rizzo (2014) explain that the prevailing discussions about strategic design initiatives jettison important considerations. They write,

Although [design thinking as a strategic design initiative] was initially meant to introduce research on design and new product development processes, it was subsequently turned into a managerial approach through the process of abstraction from its original context. The three main faults of design thinking as it was extended to the management realm were: (1) the lack of contextualization and situatedness—a typical characteristic of new, quickly adopted-and-dismissed managerial models; (2) the separation of the ideation and the development processes; and (3) the idea of a top-down practice that principally affects the management rather than the whole enterprise. (Deserti and Rizzo 2014)

These faults find a great deal of substantiation. (Utterback et al. 2006; Brown 2009; Lockwood 2009; Verganti 2009) This critique rests on the prevailing assumption within writing on these initiatives that organizational change emerges from the introduction of new conceptual activities, i.e. design *thinking*. These conceptual changes lead to procedural and structural changes (e.g. changes to the processes of work or the way companies are set-up, respectively), which in turn beget innovative outcomes. Strategic design initiatives, however, are conceptualized as prescriptive, abstract, and top-down (Deserti and Rizzo 2014), thereby reducing or avoiding attention to the particular environmental factors that may lead to their success or failure. The accounts of LTC offer some empirical support for the pitfalls and gaps riddling discourse of strategic design initiatives.

Rather than condemn strategic design initiatives, Deserti and Rizzo propose another perspective. They argue that organizational change has less to do with dogmatic procedural or structural changes, and more to do with cultural changes, such as imparting new values, developing skills, and building capacity for different sensitivities. (Deserti

and Rizzo 2014) In conjunction, cultural changes and new approaches to doing work support one another. What the authors refer to as bottom-up and emergent organizational change—value changes, sympathetic work environments, and new units of analysis—might be alternately understood as the often-unspoken foundations of design thinking in design theory and philosophy (see Chapter 2). They argue that:

[T]he products of an enterprise are not just the synthesis of the end user's needs, but essentially are the synthesis of its culture. From this assumption, we hypothesize that the development of new products often generates or requires changes in the culture of the enterprise as a kind of "side effect" related to the novelty of the products (at least for this particular enterprise). (Deserti and Rizzo 2014)

Deserti and Rizzo argue that introducing design-led activities into an organization requires and produces a certain degree of organizational change. Beyond the required reorganization of tasks, responsibilities, and roles to accommodate new activities and ends, the creation of innovative products, in their opinion, stems from an operating environment that embodies the values of such products. Deserti and Rizzo refer to this embodiment as the production of a *design culture* within an organization. A design culture produces innovative products by operating in a way that embraces both an "an 'outside-in' perspective (i.e., products as a result of quests from different external stakeholders, primarily customers) and an 'inside-out' perspective (i.e., products as results of the company's culture)." (Deserti and Rizzo 2014) In short, innovation is more than thinking; it is a way of acting. While a supportive environment seems like an uncontentious suggestion—and can be backed by the practice-oriented accounts at LTC—more complicated implications underlie Deserti and Rizzo's critique.

For Deserti and Rizzo, a design culture is "a 'way of doing things' in a context-dependent manner." (2014) This way of doing things leads to organizational change by

embodying new values, competencies, and skills. In their article, they identify three aspects of a design culture: (1) the creation of new insights, (2) the perception that failures are productive, and (3) the definition of a holistic vision. (Deserti and Rizzo 2014) These aspects are far from comprehensive of all that constitutes a design culture, yet point to what the authors mean by *culture* within their concept—the sharing of particular value structures and views rather than merely activities of designing. Deserti and Rizzo conclude that "design culture and practice, when situated within the culture of an enterprise and applied to achieve significant innovation in products and services, can lead to organizational change." (Deserti and Rizzo 2014) A design culture, which they differentiate from design thinking, permeates the existing culture of a company by pairing the activities of designing—such as, prototyping—with a value structure that they view as central to being a designer—how prototypes materialize courses of action and test assumptions. Rather than assume that the application of design-like methods in new contexts will be adopted wholesale and seamlessly integrate within a company, the authors imply that the value of design-like methods in these new contexts is bounded by the underlying value structure of the context. This approach starts from the question of how to promote the cultural aspects of design rather than the design thinking approach that emphasizes the methods first-and-foremost as innovation. The implicit, and, for Deserti and Rizzo, more important, task should be imparting cultural change (which they refer to as organizational change) rather than procedural or methodological change. While Deserti and Rizzo offer a productive way forward with regards to critiques of design thinking, their argument leaves the particulars of what *design* refers to in their definition of design culture unanswered.

Reflecting on the value of design within organizations, Nelson and Stolterman explain that a design culture is:

a culture that embraces a social, economic, political, and personal environment into which designing, and designers, are not only invited, but also welcomed. It is equally important to populate this culture with competent designers who have the education, experience, and desire to practice design from a broader perspective than the traditional practices of material design. (Nelson and Stolterman 2003)

In this excerpt, Nelson and Stolterman provide some clarity about the term design culture. Like Deserti and Rizzo, Nelson and Stolterman identify a design culture by its core principles without ascribing a necessary domain, education, or skill set. A design culture is a larger environment (presumably within a company or organization) that both empowers designers and respects their skills as different and useful. In short, a design culture is understood through its values as much as its activities.

Two pitfalls potentially plague what is meant by design within the discussion thus far: nominalism and fetishism, both of which essentialize design. Nominalism with regards to design means that design is nothing more than its label. Calling something a strategic design initiative is, then, a matter of framing. In an overdramatic interpretation of some design scholarship (Bucciarelli 1996; Schön 1983; Schön 1990), design is essentially all negotiations in which domain knowledge is insufficient. This form of essentializing negates that designing entails particular ways of representing, reflecting, and inquiring. On the other hand, fetishism with regards to design means design is a romantic and territorialized ideal. Calling something a strategic design initiative is, then, a matter of empowering people called designers or cast as designers to direct corporate strategies. In a conservative interpretation of some design scholarship (Buchanan 2001a; Dorst 2006; Krippendorff 1989; Nelson and Stolterman 2003), design is essentially all

activities performed well according to the socio-aesthetic tradition of design. This form of essentializing negates the relationship between a setting and an outcome. Both sets of scholars promoting a design culture aim to avoid these essentializations. However, another type of essentialization seems to be occurring: that of essentializing the core values of a design culture.

The account of Grim offers an entry point to this discussion. Central to the account of Grim is the term holism, which Deserti and Rizzo claim is a key cultural value of a design culture. The term holism has two (maybe more) divergent meanings at LTC. On one hand, holism focuses on the indelibility of what it is to be made. On the other hand, holism focuses on the relationality of the parts of what is to be made. While these two concepts do not necessarily need to conflict, they are certainly not the equivalences. As the account argues, the two views of holism led to different temporal rhythms of designing versus executing, different assumed power relations, and different ways of acting upon emerging issues. As such, while we can easily say the team operated on holistic vision called *the user experience of Grim*, what *holistic* meant caused the project to stall. In this account, and following Deserti and Rizzo, the contested nature of holism may be attributable to the lack or partiality of a design culture. The problem with such a conclusion, and the notion of a design culture in general, is that the concept itself assumes a stable notion of what values underlie a design culture is.

Design culture, as formulated by Deserti and Rizzo, exists outside of its doings and sayings. In other words, design culture and design practice are two separate things; Deserti and Rizzo even use these terms separately. The distinction between design culture and design practice is, then, just a reformulation of the divide between theory and

practice. However, Deserti and Rizzo also explain that a design culture is embedded in the particular environment, implying that a design culture exists in its performance. Nelson and Stolterman consider a design culture as manifest in and constituted by its activity. Regardless of the concept, part of the issue with regards to a design culture is the term itself.

While design has a tradition, the field of design is constantly (and anxiously) rethinking its tradition. As much as rethinking design begets fruitful avenues (such as service design or user experience design), design scholarship seems fixated on linking these new ideas to the old, whether for continuity or for legitimacy. (cf. Buchanan 1995a) If a design culture is fetishized as those values taught in the discipline(s) of design, then the setting and local values are negated, arriving back at Deserti and Rizzo's critique. If a design culture is only titular, then the setting and local values are mistaken for something else, negating anything particular about designing. In order to avoid these confusions, I want to offer the term *a culture of designing*.

The significance of the shift from a design culture to a culture of designing is slight. Certainly the same pitfalls plague this term when used poorly. However, the benefit of the term a culture of designing is threefold. First, unlike the previous discussion, a culture of designing does not assume that a central repository of design values exists. Instead, a culture of designing emphasizes that designing is a practice, and isolates that this practice is value-laden, as Deserti and Rizzo argue. Second, a culture of designing is active. While a minor shift (and implied in the previous term), focusing on the designing mitigates the confusion of the field, discipline, activity, and so many other qualifiers of design. Third and most importantly, a culture of designing is not monolithic.

Problematic within Deserti and Rizzo's claims about strategic design initiatives is that they do not attend to the intermingling of many cultures. A culture of designing emphasizes that designing is amongst a variety of activities that are also value-laden.

This final point provides another interpretation that is explored in the subsequent section. In a culture of designing, not everyone designs for a variety of reasons—laziness, responsibility, project demands, times, and so on. A benefit of the term is that it assume that other modes of working exist, impact, and relate to designing. Another benefit is that designing, like working, can be understood as distributed. The account at LTC user experience design was a collective and distributed outcome of designing throughout the project teams. In thinking about a culture of designing, what do we make of the designer?

Wickedness In The Ambience Of Designing

What is simple for one group is not for the other (Star and Ruhleder 1995)



A core proposition within design studies is that design has no subject matter. What authors (Buchanan 1995b; Simon 1996; Nelson and Stolterman 2003; Krippendorff 1989) mean, and as was traced in Chapter 2, is that design differs from other disciplines that have a particular object of inquiry. Design, unlike biology, sociology, or literature as examples, does not attend to any particular phenomenon in the world, material or immaterial. While the field of design is not tied to a particular observational unit or object in the world, design is tied to generalizable set of operating conditions. Unlike the sciences, design does not *describe* the world as-is, and, unlike the arts, design does not *idealize* what the world might or could be. Instead, design *synthesizes* real, true, and ideal constraints (Nelson and Stolterman 2003) into products. With this lack of a subject matter

as a starting point for design theory, scholars argue that design coheres as a field in how this synthesis is structured. What the design process abstractly renders—betterment (Simon 1996), argumentation (Buchanan 2001a), or meaning-making (Krippendorff 1989)—is debatable, yet the activities of this process, regardless of the discipline, share general similarities, such as the partiality of knowledge, working within shifting circumstances, and the iterative and reflective nature of planning such change. (Lawson 2005; Cross 1982; Cross 1992) Nelson and Stolterman summarize this idea of synthesis without the troubling language of outcome:

The way this [synthesis] is done is by making design judgements. What we desire to come into existence is a matter of judgement—based on design will (volition) and intention (aim)—and can never be found in explanations, descriptions, or predictions. Design will and design intentions are the means for initiating and directing change based on human agency. It is design will and design intention, guided by design judgement, that transform the abstractness of relevant scientific knowledge and other forms of knowledge into a final unique design, the ultimate particular. (Nelson and Stolterman 2003)

Obviously, the various disciplines of design synthesize these future conditions through particular means—products, services, systems, communication, and environments—yet all relate through a generalizable synthetic process and approach. (Often this approach is referred to as the design process, which is problematically prescriptive in name and even more prescriptive in the many branded attempts to define such a process.) Buchanan, in very general terms, identifies four ability of design—*inventing, judging, deciding, evaluating*—and four disciplines—*communication, construction, strategic planning, and systematic integration*. (Buchanan 1995a) These generalizations underlies the claims that design is universal and agnostic with regards to

its subject. In this section, I want to question this assumption by highlighting the (forgotten) setting of designing.

One of the core assumptions of design is the structure of the conditions under question. Buchanan offers the notion of "wicked problems" (Buchanan 1995b) to describe how designers work with complexity; Simon writes about "bounded rationality" (Simon 1996) to argue that design is unique in its potentially limitless solution space; Krippendorff posits that designers engage in "meaning making" (Krippendorff 1989) within an array of seemingly overwhelming potentials; Dorst argues that the conditions of design are "paradoxes" (Dorst 2006) as synthesis requires designers to overlap presently discrete and sometimes contradictory notions. Regardless of the term used, these and other scholars claim that designing begins with a set of conditions that are indeterminate, complex (related and interrelated), complicated (confusing and somewhat/seemingly unknowable), and "unstable." (Jones 2009) Again, Nelson and Stolterman provide a summary:

Every design must fit between existing and the not-yet-existing. It is a compositional assembly. In a holistic design approach, everything is embedded in a milieu, an environment, and a context framed in time and place. For designers, the context consists of those things that have been selected to stay unchanged in the face of designed change even though they could be changed. This is in contrast to the environment, which constitutes those external things that must be taken into account, but which cannot be changed by design. Designers need to be able to observe, describe, and understand the context and the environment of the design situation as adequately as possible. (Nelson and Stolterman 2003)

In this excerpt, Nelson and Stolterman set up a dichotomous setting—the context and the environment. The former refers to the circumstances in which designers seek to change; the latter refers to the circumstances that are fixed. Missing from this dichotomy is the work setting (or *workplace*) of design, an oversight that presumes the stability of

the activity of designing. The various empirical accounts here highlight the relationship between place and design—what is possible, what is a problem, and when does designing occur.

A prime example of the relationship between the activity of designing and the work setting comes from Chapter 6. The Council institutionalized standards around user experience by transforming the professional activities of user experience design into acting bodies. While user experience design occurred under the guidance of the Council, the formal structure and legacy of appointment made it rather hard to say who was designing. Since the Council delegated itself certain abilities—judging and evaluating, for example—UX design was distributed into the technology development process and so partially disembodied a notion of the UX professional. This account, as the others do too, demonstrates that the activity of designing often exceeds the implicit notion of agency within descriptions of the design process. In particular, the designing implicitly inscribes some notion of an agent, i.e. the so-called *designer*. But what do we make of the Council and its implications for how a designer can be dissolved while still maintaining design? Withholding the ethical critique of distributing an activity and so responsibility, (Bennett 2009) a lesson can be learned from media scholarship, particularly that of Alexander Galloway and Eugene Thacker.

In *The Exploit*, Galloway and Thacker theorize the techno-political notion of the network. They highlight examples from computational systems to bioinformatics to guerrilla warfare. Central to their theorization of the network, regardless of the context, is the notion of protocol and actions as protocological. They explain,

DNA computing shows how the problem-solving process does not depend on any one problem-solving "agent," but that the solution (mathematically

and biochemically) arises from a context of distributed regulation. The solution comes not from brute number crunching but from an open, flexible array of total possibilities. This is how it is protocological. (Galloway and Thacker 2007)

Using Galloway and Thacker's term, the Council sought to create a protocol for doing user experience by institutionalizing UX design within the technology development process. Designing became an activity engaged in by a network of actors—the Council, the designer (or person in charge of UX design), and the process itself to name just three. As a result, the designer could not be simply located as a single agent—the designer became disembodied and distributed into the formal procedures and structures of work. By way of the Council, the activities of design were no longer determined solely by an individual or set of individuals, but instead emerge from a distributed institutional process of product development. The recognition that designing is more than individuated will or judgement opens discussion of how the work setting contributes to the determination of design. In other words, many of the accounts point to the ambient qualities of designing rather than the forceful, deliberate, or deterministic qualities that pervade much discussion of design.

Another way to formulate this notion of ambience comes from feminist STS theorist Donna Haraway. In reflecting on subjectivity within science, Haraway argues that,

all eyes, including our own organic ones, are active perceptual systems, building on translations and specific ways of seeing, that is, ways of life. There is no unmediated photograph or passive camera obscura in scientific accounts of bodies and machines; there are only highly specific visual possibilities, each with a wonderfully detailed, active, partial way of organizing world. (Haraway 2011)

In this way, science constructs of a type of subjectivity rather than reducing subjectivity altogether into the notion of objectivity. (Galison and Daston 2007) Like Mol's continued attention to the microscope in her praxiography (Mol 2002), Haraway argues that these "perceptual systems" are composed of "bodies and machines" in which collectively produce the effect (and maybe affect) of objectivity—"the conquering gaze from nowhere." (Haraway 2011) Where Galloway and Thacker discuss the mechanisms of a setting (i.e. the protocol), Haraway enumerates the constellation of distributed subjectivities:

How to see? Where to see from? What limits to vision? What to see for? Whom to see with? Who gets to have more than one point of view? Who gets blinded? Who wears blinders? Who interprets the visual field? What other sensory powers do we wish to cultivate besides vision? (Haraway 2011)

Here again, the setting—in a looser array and aligned more with the practice perspective—presents a type of ambient relationship. While Haraway's project is to reintroduce the subject into theorizing science and technology studies, her writing posits that objectivity is a constellation of *stuff*—humans, machines, perspectives, traditions, and settings. Haraway's perspective aligns well with Practice Theory, but also highlights that Practice Theory still holds onto a notion of a human agent. While practice is distributed into the environment, practiced action still comes from the human. The Council points to a further erosion of the designer-as-agent within the activity of design.

To connect back to the beginning of this section, it is clear that within design theory the designer-as-agent is still a strong concept. The lens of practice provides a way to unpack the permeable boundaries of designing, and the accounts within this case study show that more work needs to be done. Even in the more disruptive theories of design,

like design things (Telier 2011), the human agent is granted the a special place within networks of action. I offer the notion of ambient designing to grant more symmetry to the study of design that does not evaporate the designer altogether, but places the designer in and amongst the materiality of design.

Computationality At Work

The previous two sections offer two directions to extrapolate the present case study into design studies. The first direction focused on the production of a culture of designing within the existing culture of a company. Unpacking the concept of a design culture, the case study highlights that the concept of a design culture requires attention to the setting of design work. Shifting from the term *a design culture* to *a culture of designing* reflects the way design work intermingles with many other types of work, and provides entry into the variegated materiality of all work. For example, at LTC, user experience design represented more than a set of activities or concerns that could be slotted into existing disciplines; user experience design carried a larger cultural effect of questioning how teams understood the interdisciplinary work of making products. UX design marked a local socio-material shift that neither erased nor supplanted existing value structures and assumptions. Instead, UX design, when practiced with attention to the setting, recognized the boundaries and thresholds between and amongst disciplines—i.e. produced activities that upheld values, while challenging forth new ones.

The second direction focused on the conceptual heritage of the designer-as-agent. Reflecting on the distribution of design into a setting, ambience provides a way to conceptualize designing without ascribing a strict form of agency to the designer. As a product, user experience was both located in the work of an individual and distributed

across teams. As work, user experience design required both deliberate and ambient socio-material support. In this section, I want to draw these ideas back to digital media, a domain from which this work is accountable due to its claims about the production of narratives relating to computation.

In his text connecting critical theory to the present and pervasive computational landscape, David M. Berry explains:

critical theory can contribute to the understanding of the computal [sic] and the information society beyond the usual critiques offered at a macro-level of the general principles underlying knowledge-based societies, or micro-analysis of users and the practices. Indeed, we need to pay attention to the dialectical relationship between the two, while being able to apply critical approaches to the identity thinking implicit within many discussions of digital technology. This identity thinking manifests itself in a number of ways in what I term *computationality*. (Berry 2014; original emphasis)

As Berry explains, computationality is the always already assumed condition of contemporary life that exists with, in, and through computational systems. In a literal sense, Berry means that computation and digital media are deeply present at any single moment, from smartphone notifications to hashtags littering interpersonal conversations. Computationality highlights that computational machinery and computing are available and increasingly so. More than just the presence of computational objects, Berry claims that "we are increasingly unable to think beyond the limits of the totalizing effects of computationality. Computational categories increasingly define the limits of our knowledge" (Berry 2014). In this second sense, Berry means that computation and computational metaphors currently define relations in and through the world, whether human or nonhuman—computationality defines the/a condition of being. Computational systems define the conditions of the world, from the erasure of terms like computer work

(this is just work now) to casting geopolitical distinctions in terms of computer saturation. In this twofold sense, Berry compares computability to Heidegger's notion of technicity, which refers to the inescapable condition of the modern era toward unconcealment, utilization, and extraction of resources. (Heidegger 2003)

Computability is distinct from technicity in that computability refers to the specific configuration of, what Berry calls, postmodern technologies, such as the computer.

In a very literal sense, computability stems from the ingredient that LTC makes, and provides a richer insight into the strategic parts of UX design. As a company, LTC assumes that everyday life is permeated by computational things—desktops at work, laptops in police cars, activity monitors for health, and leisure electronics construction, to name a few. The proliferation of computational things has led growth for LTC. The continual reinvention/reengineering of what they make is based on the promise of this continued expansion—expansion that has been both predictable and anticipatory from the macro-scale of units sold to the micro-scale of processor workloads. The evermore computationally dependent world is both a condition and an agenda for LTC's success. LTC was not simply building ingredients for computational systems, but contributing to infrastructurization of the computational landscape. When the desire for computing systems changed (that is, when market saturation demanded differentiation based on use), LTC looked to UX design to understand computational life.

As previously explained, user experience design grew from concerns within human-computer interaction about overly task-oriented approaches to the creation of computational systems. In response to the usability focus of second wave HCI (Harrison, Tatar, and Sengers 2007), phenomenological approaches to HCI research and design

began to explore less deterministic understandings of computational products, giving rise to fields like user experience design. Rather than conceptualizing computational products, services, and systems as tools, third wave HCI explores computation in terms of its lived experience. The roots of UX design, then, diverge from the assumptions of a Heideggerian world that technology defines a capacity to unveil resources and truth in the world. Instead, the motivations for UX design, and the justification for trusting its agenda, depend on the predictive and remediated landscape of computational systems that details (computational) technology as desirable and aspirational as much as useful and usable. In simple terms, user experience design embraces contingency, locality, and subjectivity as defining features of understanding a postmodern world. Where technicity finds expression in tool and task orientation of second wave HCI, computability finds expression in the living/lived-with orientation of third wave HCI. For LTC, UX design provided a means to explore computability as the living order in order to capitalize on it.

In a second sense, UX design work offers a more subtle point of reflection on computability. As the condition of living with computational systems, computability defines the metaphors, and so orders, of life, such as referring to a person as a user. Underlying the terms that (re)define entities, computational systems capture life. Berry highlights reification—"capitalism's ability to transform social labour into a relation between things" (Berry 2014)—as the socio-material process at work in this capture. As an activity focuses on lived experience, UX design reifies experience. Experience can be understood, cataloged, designed, refined, and predicted. For example, Hassenzahl and Tractinsky define UX as:

a consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organisational/social setting, meaningfulness of the activity, voluntariness of use, etc.). (Hassenzahl and Tractinsky 2006)

The reification of experience allows the temporality, subjectivity, and locality of living to become variables, which in turn can be processed, modulated, and eventually reduced to a pattern, a consequence of procedurality (Bogost 2006) becoming a lens on living. As a pattern, experience provides material for designing. Returning to Hassenzahl and Tractinsky, they explain that:

UX is about technology that fulfils [sic] more than just instrumental needs in a way that acknowledges its use as a subjective, situated, complex and dynamic encounter. [...] Obviously, this creates innumerable design and experience opportunities. [...] UX in the sense of a positive HCI would, thus, focus on how to create outstanding quality experiences rather than merely preventing usability problems.

As the outcome of design, experience is rendered into something that can be produced, and so commodified. Ostensibly, the notion of differentiation by way of UX (encapsulated in the second excerpt) depends on the market value of living. The objectification of experience only becomes commodification as the pattern provides hypothesis-driven future action, or abduction. (Berry 2014) While UX design at LTC focuses on making computational ingredients, UX design expresses a rooted notion of computability in the terms of its work.

In conjunction with experience as a product, UX design work also illustrates conversion of affect into a commodity. While LTC could not guarantee the final user experience of a system that housed their ingredients, the work of user experience designers (researchers included) created leverage for different agendas—on teams,

through industry relations, and within the organization. UX designing, then, could be seen as a commodity itself as it lubricated transactions. The OEM/ODM strategy provides one expression of the commodification of UX design work—UX design renegotiating the term of transactions with LTC's customers. Likewise, the monetary cost of engaging in distributed custodianship provides an expression how caring for users was paid work. In short, with experience being a product, the work associated with experience becomes exchangeable and budgeted.

In one final way, computability finds expression in UX design, namely in design itself. Berry claims that abduction is a distinctive feature of computability. Rather than being just descriptive, abductive reasoning posits possible and plausible outcomes. Abduction, not surprisingly, is also a core feature of designing. (Kolko 2010b) The coincidence of abduction in these two notions is worth reflection—how might this mutual appreciation of abduction be understood more concretely? One connection points to McLuhanian interpretations of media. For Marshall McLuhan (and aligned with Berry), a medium redefines the terms of existence, an idea summarized in his adage *the medium is the message*. (McLuhan 1964) Telephones, for example, reconfigured space by compressing those distances connected by a new communication infrastructure. Similarly, computation refigures our notions of speed, resources, information, and so many other features of the world. Statements like "There's an app for that" in part presume that all things can be universally operated on by computational systems. If we accept Berry's claim that abduction is a defining principle of computational systems, then abduction refigures human expectations of the world. Abduction offers that predictions can be inferred from anything that can be captured, known, defined, measured, or

assessed. In short, plausibility and possibility are materialized in the computational world as materials *to refigure*.

Following this logic, the design of user experiences depends on the reification/commodification of experiences. Such a transformation relies on abductive reasoning about what factors/variables compose the experience in order to engender it elsewhere with(in) others, that is, how to *design* experiences. For example, Pucillo and Cascini explain "User Experience Design should be about making proposals to people: the experience provided by the artefact should be the result of a proposal made to the users" (Pucillo and Cascini 2013). Regardless of how heavy-handed, UX design seems symptomatic of the increasing designification of problems—transforming all matters into problems for design. Pucillo and Cascini, for example, make UX design into a matter of affordances, thus reducing experience to a known term for designers. While the connection to computability may be weak, the implications of designing the world are nonetheless worth considering in light of this overlap in ideas like abduction.

The purpose of this section has been to reflect the case study in terms of digital media scholarship. Berry's notion of computability helped explore how UX design and UX design work relate to broader notions of media theory and the computational. The final point about the implications of designification (an admittedly clunky term) will be explored further in the next section.

In The Fold Of Design: Designing Design and Everything Else Too

To put the matter starkly, the advocates of communitarian ethical reform want designers to be doers, but they are at heart—makers, and it is perhaps impossible for them to change. (Wang 2013)

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Design is attractive to management because it is a de-politicized version of the well known socio-cultural critique of managerial practices. Design thinking is so popular because it raises only questions of "creativity" or "innovation" without ever questioning the legitimacy of managerial practice. Instead, design thinking aspires only to "better" management technique by investigating "contextual problems" or the truly innocuous "pain points." [...] Design thinking alone will not solve these problems because a lack of creativity was never the issue. The real issue is one of power. (Ladner 2009b)



An appropriate end to this research is a proposal for more research. As mentioned in the introduction, the application of design methods and approach has received increased attention outside of the field of design. The present case study focuses on that attention within business and management that shifts from the business and management of designers or the design aspects of projects to design (thinking) as a scaffold for business and management itself. This latter state is what has been called a strategic design initiative, and has been explored through the variegations of daily work. Another area in which design has found a foothold in recent years is the realm contemporary social issues under the label of so-called social innovation, entrepreneurship, and transformation. A prime example of this work is text *Design for the Other 90%* (C. E. Smith 2007). *Design for the Other 90%* argues that designers and design educators tend to overlook meaningful problems in lieu of more alluring or profitable interests. In response, the various contributions within the book demonstrate how a designerly approach can attend to issues such as access to clean water. While the text and exhibit has been critiqued for embracing a form of neocolonialism through technology (Stairs 2007), I want to raise another fundamental issue—what are the limits of design?

Much of the discussion of design for social issues touts various flavors of design as the key to unpacking the unending complexity of social problems. For example,

IDEO.org recently released a book and online text titled *The Field Guide to Human-Centered Design* (IDEO.org 2015). The methods, approaches, and activities within this book are typical of many contemporary practical design texts. For example, *The Field Guide* explains methods like card sorting and user interviews, approaches like "get visual" and "explore your hunch," and activities like pilot testing and building partnerships. A series of one-page articles precedes the descriptions of what to do, in which elements of design process are explained, such as empathizing, prototyping, learning from failure, and iterating. Like many practical design texts, the focus is on doing design, and there are many beautifully shot pictures of post-it notes and prototypes and designing happening, as one can only assume, *in the field*.

The first written text within *The Field Guide* is an explanation titled "What does it mean to be a human-centered designer?" The first paragraph of the two-paragraph description lays out the stakes:

Embracing human-centered design means believing that all problems, even the seemingly intractable ones like poverty, gender equality, and clean water, are solvable. Moreover, it means believing that the people who face those problems every day are the ones who hold the key to their answer. Human-centered design offers problem solvers of any stripe a chance to design with communities, to deeply understand the people they're looking to serve, to dream up scores of ideas, and to create innovative new solutions rooted in people's actual needs. (IDEO.org 2015)

The optimism of this paragraph is clear (it should be expected since optimism is one of the defining features of a human-centered designer according to *The Field Guide*). Certainly human-centered design offers a great deal of strategies and tactics to understanding the local expression of various social issues, and even holds insight into what various products, services, systems, and policies can contribute to mitigating such issues. Even more wanting to address "intractable" problems is important and returning

knowledge to the community aligns with the philosophy of participatory design and activities of co-design. Human-center design, without question, provides a framework for making something that responds to the complexity of these problems. While I would argue that these "problems" are better understood as issues (Marres 2007; Marres 2012) or matters-of-concern (Latour 2005a; DiSalvo et al. 2014; Lodato and DiSalvo forthcoming) and so are not solvable in the sense posited by *The Field Guide*, here is a more fundamental question that needs to be asked: what are the limitations or capacity of design to address these issues? The claim is not that design is ineffectual or incapable of doing *something*. Instead, the claim is that "dream[ing] up scores of ideas [...] to create innovative new solutions rooted in people's actual needs" (IDEO.org 2015) misleads the readers of *The Field Guide* into assuming that creativity dulls the thorniness of issues. In other words, what exactly does designing offer these issues?

While the present case study has argued for a shift within design studies to explore design work—what work counts as designing and what design counts as working—rather than the design process or design cognition, *The Field Guide* points to why this shift is an imperative. As design shifts in focus and topic to include social and civic issues, design scholars and researchers need to become attuned to the capacities of design to have an impact. As James Wang argues, designers tends toward the Aristotelean notion of *making*—that is, perfecting the made—"in contrast with doers—those who work prudentially to establish justice and are very concerned about public values and social effects." (Wang 2013) The point being argued is that the discipline of design has limitations with regards what it means to engage issues, but one could extend this argument to methods, activities, and orientation of designing regardless of one's

profession. While Wang rather rigidly assumes the impermeability of the making and doing, his underlying motivation is provocative—what if design can't do everything, not because of some lack of empathy or attention, but because designing itself has limits. While potentially universal in application (Buchanan 1995b; Buchanan 1995a), designing is not universal in outcome, as this dissertation has shown. Certainly no one is outwardly claiming the latter. However, texts like *Design for the Other 90%* and handbooks like *The Field Guide* do not address these limits in explicit ways, and scholars of design tend to define design based on its scope rather than outcome. Simon, Buchanan, Krippendorff, Doorst, Nelson and Stolterman, A. Telier, Schön, and Bucciarelli—the theoretical legacy of this case study—all attend to designing in terms of its scope rather than its outcome. However, by advocating or implying a universal scope of design an ethical imperative is raised to understand what is it that design brings to these settings. This imperative should not dampen or arrest activity. Rather exploring the limits of design makes room for what else needs to happen with regards to these social issues that cannot be done through more comprehensive knowledge during design.

To connect this imperative to the case study and to propose future work, within a given context designing, limitations stem from the materiality of designing and the formulation of design work. What is available matters and what is valid matters. This research has shown that what work counts as designing and what design counts as working do not overlap entirely, and these remainders and intersections stem from the localized materiality of designing. In the context of contemporary issues, further work needs to be undertaken in these contexts that does not propose new methods, new definitions of design, or new processes. Instead, future work needs to catalog what it is to

do designing and compose a rich description of these contexts of working. Likewise, future work needs to unpack the distinctions between the aesthetic form of designing (sticky notes and sketches and the like) and the activities of designing (inquiry, synthesis, reflection) in order to speculate on what design is *without* its current representations. This speculative work turns away from the discussion of the materiality of design only in the sense of trying to validate designing that does not look like designing. Lastly, future work needs to be undertaken that articulates the differences between various applications of design—within management, business, governments, and so on—to also make room for presently excluded activities in these domains and invigorate critique of the underlying power and labor issues elided by creativity.

In short, maybe the limitations of design are not from inadequate research methods or yet-to-be-invented disciplines, as so much scholarship and writing has essentially argued. Maybe the unification of knowledge across the professional and academic domains or the ontological subtleties that are missing from definitions of design are not the core problem in the end. Maybe the limitations of design stem from design itself rather than some circumstance of design. The dissertation is distinctive for focusing on the socio-material production of design and design practice. This approach recaptures design practice, engaging the setting and activities as the resources for understanding design. The goal has not been to assert some essentialized idea of design, but instead assume that design is directly observable in its doings and sayings. Design as a practice begets its own qualities and theory. The ethical questions around design still are important, and must remain of top importance in these settings, but also we need to introduce the humble idea that design cannot do it all.

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