

UNIVERSITY OF CALIFORNIA  
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**SITUATED PLAY DESIGN: CO-CREATING THE  
PLAYFUL POTENTIAL OF FUTURE TECHNOLOGY**

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DOCTOR OF PHILOSOPHY

in

COMPUTATIONAL MEDIA

by

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## Abstract

# SITUATED PLAY DESIGN: CO-CREATING THE PLAYFUL POTENTIAL OF FUTURE TECHNOLOGY

by Ferran Altarriba Bertran

In this dissertation I present my participatory design-led doctoral research exploring how to co-design technology that playfully enriches the experiential texture of people's mundane, everyday activity. My work responds to the dominance of productivity-focused agendas in technology design; it aligns with an existing body of works that foreground the importance of designing technologies and experiences that cultivate alternative, less materially productive societal values such as social connection, emotional fulfillment, or cultural richness.

To facilitate a move towards technology futures that are more socio-emotionally sensitive and democratic, I present a three-fold contribution. The first dimension is conceptual: I present the "Technology for Situated and Emergent Play" "bridging concept" [69], an "intermediate-knowledge" [132] form that highlights three experiential qualities of play that have socio-emotional value and provides inspirational examples of how technology might incorporate them. My second contribution is methodological: I propose "Situating Play Design" as a novel methodology for designing for play from the bottom-up and in contextually sensitive ways, as well as an early toolkit of methods to put it in practice. Finally, I contribute domain specific knowledge in two specific areas within tech design: by experimenting with the above concepts and methodology, I investigated increasingly playful avenues for technology innovation in the domains of mealtime and urban experiences.

Overall, my work will provoke, inspire, and empower designers to co-create, from the bottom-up and in imaginative ways, technology that enriches the experiential texture of mundane, day-to-day situations and activities. I hope it serves as the seed for an exciting research program exploring how to engage diverse stakeholders in co-designing technology futures that realize the playful potential of people's day to day, in ways that privilege a diversity of perspectives alongside the designer's expertise.

## Acknowledgements

In the soil my parents and brother cultivated, my cousin Joan planted the—rather crazy, let's face it—seed of my passion for design. Francesc and Oscar saw it and watered it generously; they helped it sprout. Danielle enriched the soil with invaluable fertilizer, and the plant grew deeper, wider, stronger. It was under Katherine's care that it finally blossomed, colorful and bright. And Marina—what can I say? Marina was the sun that nurtured it all along: the love, warmth, and support the plant needed to thrive. The fruits of my work would be bland and boring if it weren't for all of you, you incredible human beings. I'd like you to feel that they are yours too, to savor them together. And I hope you're as happy with them as I am myself. I'm forever grateful for all we've lived together. *Us estimo!*

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# Chapter 1

## INTRODUCTION

This dissertation builds on the idea that play and social connection are key to a life worth living. That idea is by no means new—the potential of play to enrich our day-to-day has been explored by many, in fields as diverse as sociology [52], cultural studies [134], philosophy [122], psychology [42], computer science [246], and design [106], among others. Cutting across many disciplines there is a consensus that living a playful life can contribute to the wellbeing of both individuals and groups. Though not novel, that idea is very relevant and timely in the current era of blooming technological innovation. My doctoral research has explored how to make that idea more present in technology innovation and empower designers and researchers to incorporate it as a guiding value in their work. In this chapter, I begin by characterizing the design research space targeted by my work, Playful Human-Computer Interaction, as well as the motivations behind it (Section 1.1). Then, I formulate my research questions and contribution (1.2). Next, I describe my methodology (1.3). Finally, I provide an overview of the contents of the dissertation (1.4). Overall, I hope that this chapter helps position the outcomes of my doctoral research for the reader.

### **1.1. Research space and motivations**

Technology is increasingly present in our lives. It permeates our daily routines, in and beyond the workplace, to a point that it can be hard to find situations where we are not surrounded by computation. Even those activities that have traditionally been analog, such as cooking, sightseeing, or working out, are now being populated with digital gadgets and services, e.g. smart cooking appliances, GPS-based navigation services, or smartphone apps that track our moves. All those artifacts add computational augmentations to otherwise analog mundane

activities. Whether directly or indirectly, they have a significant influence on what we do and how we do it—and, perhaps most importantly, on what we experience in the process.

The more consumer-level technology mediates our lives, the more important it is to pay close attention to how we design it. That is one of the roles of Human-Computer Interaction (HCI) research: studying the impact of tech use on human life and inspiring future designs. HCI is a multidisciplinary field that encompasses a broad range of perspectives, including psychology, social sciences, computer science, engineering, arts, and design, among others. While a recurrent focus has traditionally been to explore how tech can support us to be productive—a focus that is, to some extent, still pervasive [185]—there is a growing understanding that tech should respond to a richer and more diverse pool of use cases [1]. Nowadays, technology-use transcends the workplace and its associated need for efficiency: we use it at home, in the streets, when we play, or even when we eat. As such, it plays different roles in our lives and must respond to divergent values and expectations. Considering the increasing presence of technology in people's day-to-day, Playful HCI emerged as a proponent of tech innovations that incorporate the many qualities of playful experiences to enrich people's daily lives. Just like the larger space of HCI, Playful HCI is a big, broad domain; it encompasses a multitude of aims, employs a breadth of approaches and methodologies, and is regulated by (often divergent) underlying values with regard to the role tech should play in human life.

The work I present in this dissertation aligns with, and extends, a body of works in playful tech design and research whose underlying agenda is to explore how technology could enrich people's day-to-day in ways that are socio-emotionally rich. Considering the pervasive role of computation in our lives—in and beyond the workplace—I see a need to further explore how play can be a lens through which we can reclaim our social and emotional needs and place them to the forefront of technology design. In the next subsection, I unpack how my doctoral research contributes to advancing that agenda.

## 1.2. Research questions and contribution

Humans are not productivity tools, we are creatures motivated by pleasure, by social and emotional connection, by agency, and by positive feelings. Sharing experiences with others, expressing our culture, caring for others' emotions as well as our own, or simply experiencing excitement, joy, and fun—these are all fundamental human needs society should cultivate. Because I believe in the importance of those unmaterial (yet still relevant) needs, since I began my career as a designer, I have had an agenda of responding to them.

During the years prior to initiating my Ph.D., I was involved in several design and research projects at the intersection of play and tech design, in and beyond academia. By designing playful artefacts, technologies, and experiences, I explored how play and playfulness could help to add socio-emotional value to diverse areas of human life. I learned a lot about play, about people's behavior, and about designing at the intersection of the two. But I also experienced struggles that were recurrent in most of my design work: First, I found that in technology design, play was often seen as a valuable tool to motivate people to be more productive or efficient. It was much less common to see examples of playful designs focused on other, less materially productive agendas such as fostering social connection or emotional wellbeing—not because play lacks the capacity to tackle these agendas, but because they are sometimes seen as less consequential (and, therefore, worthy) outcomes of technology innovation. Second, I often found it challenging to design for play that was contextually meaningful: I experienced a lack of mechanisms and guidance for designing technology that integrated smoothly within people's ordinary practices and afforded experiences that resonated with their desires in the context of their day-to-day.

This thesis is the outcome of a project aimed at addressing those issues. Generally, my aim is to contribute to a body of research that explores the question: How can we design for play

that permeates everyday life and supports us socially and emotionally? With this work, I want to, first, empower designers to co-create new technologies that afford contextually meaningful forms of play and, in doing so, enrich the socio-emotional texture of people's daily activity. I also intend to influence other stakeholders who set agendas in technology design, such as funders, managers, or policy makers. Overall, my aim is to contribute to steering the digital technology sector in increasingly playful and socio-emotionally sensitive directions.

To advance that agenda, I present a threefold contribution. Its first dimension is conceptual and addresses the question: Why should designing for play that is not materially productive be considered a worthy agenda in HCI? I present an intermediate-level knowledge piece that highlights experiential qualities of play that are socio-emotionally desirable—and hence, relevant to technology design. My second contribution is methodological: I present a novel approach to play design, as well as a set of tools to make it actionable, that I hope will empower designers to embrace an increasingly playful, situated, and socio-emotionally sensitive approach to technology design. Finally, my third contribution is domain specific: I illustrate how the above concepts, methodology, and tools can be put in practice to guide technology design in two specific design spaces within HCI: Human-Food Interaction and Smart City innovation. In the following pages I unpack these three pillars of my contribution. Figure 1 below synthesizes them graphically.

### **1.2.1. Conceptual contribution**

The first contribution of my thesis is conceptual (Chapter 3). It responds to the fact that, while play is regarded as a fundamental part of human life by scholars from myriad disciplines, that body of knowledge is not always embraced in tech design—in part, I argue, because it is not necessarily accessible enough for designers. In my own work, prior to my Ph.D., I often found it hard to position the design of unproductive playful artifacts and experiences as a worthy

RESEARCH QUESTION			
How can we design for play that permeates everyday life and supports us socially and emotionally?			
	<b>CONCEPTUAL</b>	<b>METHODOLOGICAL</b>	<b>DOMAIN SPECIFIC</b>
Three-fold contribution	Why should Playful HCI transcend productivity-focused agendas?  How can playful technology contribute to people's social and emotional wellbeing?	How can we design technology that intertwines well with mundane activity?  What tools and strategies do we need to design for situated and emergent play?	How can we reclaim the social, emotional, and cultural relevance of mealtimes by design?  How can we rethink the way we go about smart city innovation in increasingly playful and socio-emotionally sensitive directions?
	Productivity-focused agendas dominate in Playful HCI (and HCI as a whole).  The potential of playful technology to respond to people's socio-emotional needs is underexplored.	Most methods available to play designers are either not focused on play and playfulness, or not situated and participatory enough.  There is a lack of methods that support the design of playful technology that integrates well with mundane activity.	The conceptual and methodological contributions of this doctoral project are design-oriented.  It's important to show how those methods and concepts can open new and alternative directions for technology design in specific application domains.
Research output	<b>CHAPTER 3</b> <b>Bridging concept</b> characterizing the design space of 'Technology for Situated and Emergent Play', foregrounding qualities of play that are desirable from a socio-emotional perspective, and highlighting inspiring design features that could guide future designs in this space. – full paper at CHI'20	<b>CHAPTER 4</b> <b>Novel approach</b> to designing for play that permeates everyday life: 'Situated Play Design'. – full paper at DIS'19  <b>CHAPTER 7</b> <b>Toolkit of strategies</b> to make the Situated Play Design actionable, including three methods: <b>Play &amp; culture workshops</b> – pictorial at DIS'20 <b>Chasing play on social media</b> – late-breaking work at CHI'20 <b>Designery Tele-Experiences</b> – ToCHI article (under review)	<b>CHAPTER 5</b> <b>Case study</b> where I used the Situated Play Design approach to co-create technology that enriched mealtimes playfully and socially. – full paper at CHI Play'21  <b>CHAPTER 6</b> <b>Case study</b> where I used the Situated Play Design approach to co-speculate how smart city infrastructure could respond to people's playful cravings within the urban space. – full paper at MindTrek'21 – full paper at CHI'22 (under review)

Figure 2. Summary of the research questions, motivation, intended contribution, and research output of this thesis.

design agenda. I usually had to vouch for the importance of everyday play as a source of individual and collective wellbeing—often, with little success. That is why I set out to contribute to making the design of unproductive playful tech a more present agenda in HCI.

Why are play and playful engagement a fundamental human need? In what ways can they enrich our lives socially and emotionally? How could technology design afford socio-emotionally desirable playful experiences? And what design features might be useful to do

that? Those questions have been asked before, from different fields and angles. Yet, as I argue in Section 2.1, the answers are often overlooked in HCI. The conceptual contribution of my thesis aims to foreground those ideas and make them more accessible to designers, in the hope that that will help to shift the HCI community's attention towards increasingly playful and socio-emotionally sensitive approaches to technology design.

To do that, I present a “bridging concept” [69] that characterizes the design space of “Technology for Situated and Emergent Play” and discusses the capacity of these kinds of artifacts to respond to people's socio-emotional needs. My work foregrounds a body of play scholarship (from within but especially from outside of HCI) that has investigated the relevant role of play in human life. To make that theoretical foundation accessible to HCI designers, I use a set of technology exemplars to illustrate it. The resulting “intermediate-level knowledge” [159] piece can support a shift towards increasingly socio-emotional approaches to Playful HCI: it makes theory tangible and actionable, proposing design qualities that can inspire future playful technology designs that better respond to people's socio-emotional needs.

### **1.2.2. Methodological Contribution**

The second contribution of this thesis is methodological. As noted above, in prior design work I experienced a lack of methods that helped me to design interventions that responded to people's playful desires. That is, perhaps, one of the grand challenges of designing for play that intertwines with ordinary life: dealing with and designing for its highly contextual nature. While in games and other forms of dedicated play the play experience is markedly separate from ordinary life [229], in playful technology for non-play scenarios, the line between play and non-play activity is rather blurry [1]. That brings about several challenges for designers, as playful interventions must coexist and integrate well with the underlying structures of the non-play activity at hand. In my own work, I saw a lack of tools to tackle that challenge.

In response, I set out to develop strategies for designing for play that respond to people's idiosyncrasies and contexts. Over the last four years, I asked myself: How can we design for play that is contextually meaningful and adds socio-emotional value to people's ordinary practices? How can we learn about, and respond in a designerly manner to, the playful things people do and enjoy in their daily lives? How can we design meaningful play interventions that respond to people's playful cravings, rather than proposing extraneous and potentially disruptive play experiences? How can we involve diverse stakeholders in shaping the design of new playful technologies in ways that respond to their understandings of what is fun?

To empower myself and other designers to tackle those questions, in Chapter 4 I present a novel design approach, Situated Play Design (SPD), that builds on and extends existing play design approaches by highlighting the importance of situated and participatory design activity. It empowers designers to engage users and context in depth as a means of centering attention on the kinds of playful things people already do—what I call “play potentials”—and using those to build the foundations of a novel playful intervention. SPD can help designers to learn about the playful practices that are already meaningful in a given context, and design technology that responds to that playful potential. It supports bottom-up playful technology design processes where the playful foundations of a design intervention are negotiated by diverse stakeholders rather than being defined by expert designers alone.

SPD emerged from a series of reflections I made from what worked and did not work in design processes I was involved in prior to my doctoral work. The approach was formulated in collaboration with some of my colleagues, and hence it was contrasted with and extended through their own lived experiences as play designers. To further develop my methodological contribution, during my Ph.D. I experimented with the SPD approach in two design cases. That allowed me to develop strategies to make it actionable—I present them in Chapter 7.

### **1.2.3. Domain specific contribution**

Finally, the third contribution of my dissertation is domain specific. As mentioned above, my conceptual and methodological work was motivated by the struggles I experienced in my own design practice. As such, it was a priority for me that my research was grounded in and applicable to real, hands-on design work: How can designers implement the concepts and methods presented in this thesis to rethink the way we go about technology design? To answer this question, I experimented with the proposed Situated Play Design approach to design Technology for Situated and Emergent Play in two design spaces that, according to recent research, could benefit from a more socio-emotionally sensitive approach: the fields of Human-Food Interaction (Chapter 5) and Smart City Innovation (Chapter 6).

In both design projects, I experimented with the SPD approach to investigate how play could be used as a lens through which to reclaim the importance of the socio-emotional texture of people's interactions with and through technology. That allowed me to propose, in both cases, exciting design directions that hold promise for affording technology-mediated experiences that are socio-emotionally rich. As explained above, the case studies also served as testbeds to further develop my methodological contribution. They allowed me to experiment, challenge, and concretize the SPD methodology: by using it in real design cases, I developed strategies to make it actionable and got a better understanding of how it could help us to envision increasingly playful technology futures. Overall, the domain specific work of my doctoral research yielded two outcomes: (1) it helped me to produce domain specific knowledge relevant to Human-Food Interaction and Smart City innovation, and (2) it allowed me to reflect on how the conceptual and methodological contributions of my work can help designers to embrace increasingly socio-emotional approaches to technology design.

### 1.3. Methodology

My work sits at the intersection of play design, design research, and HCI. An important part of my contribution, the methodological one, can be considered “research about design” [99]: a designerly inquiry [45] into the nature of design [65] aimed at developing new mechanisms to support design practice [99]. Much of my work can also be considered a case of “research through design” [100][112]; the experiments I conducted were done through reflexive engagement with design practice. Following an action-reflection approach to design research [212], I used co-design [210] and participatory design [184] processes as the principal strategy for producing new knowledge [112]—both methodological and domain specific.

My methodological contribution emerged directly from reflection about my previous design work, as well as from a set of design-led experiments that build on those earlier experiences. I used the design cases as testbeds for further developing my novel playful design approach: I experimented with, challenged, and concretized what it meant to do Situated Play Design, and organically developed new tools to make that approach actionable. That process allowed me to make my methodological contribution tangible and actionable. It also deepened my understanding of how SPD could add value in playful design and research. Finally, it helped me to begin to create a toolkit of strategies to put it into practice, which I hope other designers will find useful in their work. My domain specific contribution is also entirely design-driven: my proposals for playfully rethinking the fields of Human-Food Interaction and Smart City innovation are a direct result of a process of participatory research through design.

Aside from design-led approaches, I also employed other methods. My conceptual work, focused on making existing theories more accessible to designers, required a complementary approach. While I present the outcomes of this contribution as a “bridging concept” [69]—an “intermediate knowledge” form [159] that has its origins in designerly HCI—the path I took to

conduct this part of the research was not necessarily design-led: I combined a literature review of play scholarship with a close reading of existing playful designs, to make more accessible a relevant theoretical foundation that can inspire future designs (see Chapter 3).

Importantly, the design-led approach I used throughout the thesis shapes the outcomes of the research, as well as what can be expected from it. My work is “generative” rather than “validative” [112]—that is, it is more concerned with proposing alternative ways of going about technology design than positioning those approaches as unquestionably more valid than existing ones. I present my work as a necessary alternative that will enrich the design and research space of Playful HCI with new and valuable ideas. Overall, my goal is to offer a reflexive account of the learnings from my own design practice, in the hope that they will inspire other designers doing similar work. In the next section, I give an overview of the contents of this thesis to show where the different parts of my contribution are located.

## **1.4. Summary of contents**

Here I briefly lay out the trajectory of each chapter of this thesis. It begins with a review of related work (Chapter 2). To characterize the design research space my work speaks to, I begin by exploring the “why” of playful technology design: I describe the most common reasons behind the design playful technology and surface a wide range of agendas in this space (2.1). That helps me to position my work in alignment with a specific kind of playful tech: that focused on supporting people socially and emotionally in mundane, non-play scenarios, regardless of any utilitarian gains. Once the motivation behind my work is covered, I unpack the “how” of play design: I discuss existing methodological approaches to designing for play (2.3), as well as relevant participatory and co-design techniques that are not necessarily play-focused but are still relevant to my practice (2.4). Overall, this chapter allows me to highlight that: (1) in HCI, play-related research often gravitates towards making our

playtime productive, which is a missed opportunity given the capacity of play to enrich the socio-emotional dimension of our lives; and (2) there is a need for new co-design methods that support bottom-up and situated playful technology design practices and center on affording play experiences that are contextually sound and socio-emotionally sensitive.

In Chapter 3 I present the conceptual contribution of my dissertation, which addresses the first opportunity space identified in my review of related work: it positions the design of socio-emotionally focused playful technology as a worthy agenda in HCI. To foreground that idea, I present a “bridging concept” [69] that makes accessible a broad range of play scholarship to highlight experiential qualities of play that can enrich our lives beyond productivity. I illustrate those theories through real technology exemplars, hoping to inspire designers to leverage play’s capacity to enrich the socio-emotional texture of people’s day-to-day.

Once the conceptual contribution of my doctoral research is covered, in Chapter 4 I present the first part of the methodological one: a novel design approach called Situated Play Design (SPD). I begin by describing the foundations of the approach, i.e. how I developed it building on my colleagues’ and my own prior experience as designers. Then, I reflect on its potential in connection with existing co-design and play design approaches. Finally, I highlight the need for new methods, tools and strategies that help to make SPD actionable—a need that I began to respond to as part of my doctoral research, as described in Chapter 7.

In Chapter 5, I present the first case study where I experimented with the SPD approach: a project exploring how to design mealtime technology that affords playful, in-person interaction among diners. Chapter 6 describes the second case study: a project investigating the playful potential of urban spaces and speculating on how future smart cities could help to realize that potential. By closely examining the two case studies, I show how I explored, further developed, and experimented with techniques for making SPD actionable. The two case

studies yielded “intermediate-level knowledge” [132] that can be used to advance design and research in their corresponding spaces (Human-Food Interaction and Playable Cities).

Chapter 7 presents the second half of my methodological contribution: I distill some of the processes described in the case studies to highlight three concrete strategies that can help designers to implement the SPD approach. First, I present a method for sourcing playful inspiration in culture, playing with and learning from the forms of play that are embedded in rituals and traditions (Section 7.1). Second, I describe a strategy for leveraging social media to empathize with people’s playful desires, using it to capture, store, retrieve, and make design use of people’s lived experiences of playful situations occurring in naturalistic settings (7.2). Third, I formalize the “Designerly Tele-Experiences” method, which enables designers to engage remote stakeholders to co-speculate about the playful foundations of emergent design spaces by co-experiencing preliminary prototypes of possible design directions in that space (Section 7.3). Overall, this section intends to be a first step towards creating a methods toolkit that supports Situated Play Design practice—a first stage of a research program that I intend to continue to work on as I move forward with my academic career.

In Chapter 8, I reflect on my contribution, its value, and its implications. I answer questions such as: What can be learned from my work? How does it extend previous contributions to Playful HCI? Why is this important for design research, and how can it help designers to positively impact society? I also reflect on the limitations of my work and the many questions it leaves unanswered—thereby pointing at research directions I will pursue in the near future. Finally, Chapter 9 is the conclusion of the dissertation, where I reiterate the aims of my doctoral research and the key contributions of my work. I position it as part of an ongoing body of research trying to support increasingly socio-emotionally sensitive technology design. I hope that the combination of those 9 chapters contributes to my overarching agenda of supporting increasingly playful, situated, and socio-emotionally sensitive technology design.

## Chapter 2

# BACKGROUND

## THE STATE OF PLAY IN HCI

In this chapter, I characterize the design and research area targeted by my work: Playful Human-Computer Interaction. I begin by reviewing the current state of research in this space, highlighting different agendas behind it, and showing the dominance of works that focus on leveraging the productive and motivational capacity of play rather than its capacity to enrich the experiential texture of people’s daily lives. Following, I look at playful tech design from a methodological standpoint, to show different approaches to designing for play. I also review participatory approaches outside of the specific domain of play and playfulness, wherever relevant to my work. That allows me to stress a need for more bottom-up, participatory, and contextually sensitive play design methods. Overall, this chapter sets the foundations of my Ph.D. research: it grounds my agenda of foregrounding the value of designing playful tech that responds to people’s socio-emotional needs, and it highlights the need for new methods that support multi-stakeholder co-design of those technologies from the bottom up.

### **2.1. Dominant approaches in Playful HCI**

Over the last years, the field of Human-Computer Interaction (HCI) has undergone a move towards framing technology as something more than a tool to get tasks done—the so-called “third wave of HCI” [33]. Today, it is common that researchers explore how computational media can support us experientially and respond to our social and emotional needs—in and beyond entertainment domains, e.g. [125][130][140]. In this context, the idea of investigating play as a strategy to craft compelling experiences with and through technology is gaining traction, both in HCI and interaction design [77][106][128][141][166]. An important subset of

play- and game- inspired approaches to HCI has centered on play as focused entertainment, or autotelic play and games, focusing on the intrinsic value of play as an inherent, non-instrumental, self-contained enterprise. But the interest of the HCI community in play and games is growing and transcends the scope of pure entertainment. Researchers also investigate how to leverage the desirable experiential qualities of play in mundane situations (e.g. [142][166]), and how to design porous magic circles where play is intertwined with non-play activity (e.g. [106]). My work explores that intersection between play and everyday life.

The design space of playful technology for non-entertainment activity is diverse. It includes works that respond to diverging ideas of the value of play and its role in human life. An important subset of works in this space explores how to use play in “serious” domains, e.g. education, health, or the workplace, to support productive goals. For example, “gamification” [46][77] uses game elements (e.g. points, badges, leaderboards) to motivate users to achieve productive results in activities that are not intrinsically fun enough by nature, e.g. “Classcraft” [209] is an app that motivates students to perform better at school by augmenting the learning process through gameful challenges and rewards. Other productivity-focused approaches to Playful HCI are “serious games”, i.e. games designed for a primary purpose other than entertainment [172]; games that identify with the “Games for X” label, e.g. games4Health [240] or “games for learning” [121]. Cutting across those works is the aim of using the motivational power of play to achieve tangible results.

While the idea of instrumenting play to support productivity has important traction, we also see works more focused on balancing the quality of the play experience and the productive outcomes that are expected from it. For example, Pearce advocates for “productive play” [196] that is tied to a tangible purpose yet meaningful to users. “Meaningful gamification” [188] affords space for player-generated content that emphasizes the intrinsic value of play experiences. Marshall et al. propose an alternative to mainstream “exergames”: “focus[ing]

more broadly on the wider positive nature and effects of physical play and to create new and exciting exertion gaming experiences which are not bound by the need to count calories or measure obesity related results" [171]. This suggestion has been implemented through "playification", e.g. in physical rehabilitation [166]. Playification emphasizes the quality of the play experience at least as much as (if not more than) end goals, thereby extending mainstream gamification approaches, which have been criticized for their excessive focus on productivity to the detriment of the user experience [237].

## **2.2. Transcending productivity: socio-emotional approaches to playful technology design**

Humans are not productivity tools. We are creatures motivated by pleasure, by social and emotional connection, by agency, and by positive feelings [44]. Play can be a way to bring these properties into the systems we build: it is a fundamental aspect of human life [233] and culture [52][134] even when it is not materially productive [231]. Sharp and Thomas call this the "eudaimonic" function of play: even if it does not yield materially productive outcomes, play can be considered socio-emotionally productive [217]. My work builds on this idea that there are other values that play design can bring to society beyond performance and productivity—an idea that is not new but might need to be reiterated in HCI.

The idea that consumer-level technology can be playful regardless of a tangible outcome is in tension with contemporary trends placing productivity and performance at the core of human fulfilment [47][217]. That is a conundrum, as play, "the space within which we experience the world above and beyond utility" [217], is known to be an important factor for both personal and societal wellbeing [42][52][134]. Too much emphasis on productivity, progress, and future rewards may risk not being focused on, engaged with, and enjoying the present [216]: "In seeking to spend life as productively as we can, we bring upon ourselves the ultimate

ironic punishment: we miss it" [47]. Brown, a medical doctor specialized in play therapy, notes the negative aspects of "playlessness": "When play is denied over the long term, our mood darkens. We lose our sense of optimism and become incapable of feeling sustained pleasure" [42]. Burkeman argues for the value of play as an "antidote to this disease" [47]. Perrin, a clown volunteering in refugee camps, also stresses the importance of daily play: "In this world we live in, we really need to squeeze in more play. Play in your workplace, [...] in your home, [...] in the car, [...] in the supermarket. At the very least, what you'll find is a few more smiles in a few more faces. But at the very most, you may just change somebody's perspective on who they are and change their lives" [198]. Sicart adds to this with a "call to playful arms against technical determinism" [218], stressing the need to design technology that enables us to experience everyday play as it responds to basic human needs.

Despite the vast body of multi-disciplinary research positioning play as a valuable, necessary part of our lives, in HCI, using play to motivate, engage, and support productive and tangible goals seems to be a more popular research agenda than exploring its socio-emotional potential. While this trend has not been demonstrated quantitatively, it has been noted by many. Although popular in academia, and especially in the industry sector [247], productivity-focused approaches to Playful HCI have received criticism for embracing a narrow understanding of play [214], for being too designer-centric [188], and for focusing more on supporting the productive outcomes of the activity rather than on the experience itself [171], which has raised ethical concerns [37][190][200]. For example, focusing on the specific space of "exergames"—i.e. games designed to encourage physical exercise—Marshall et al. note and criticize that most works use play as a strategy to support measurable outcomes, e.g. losing weight [171]. Similarly, Linehan et al. warn that "games4health" often "instrumentalize game design to bring about significant [...] change in the behavior of players" [157]—an outcome-oriented approach that builds on the "conception of a player as a deficient or broken

entity in want of repair" [157]. In gamification, Rey suggests that its "basic appeal [...] is that it has the potential to spur economic activity by influencing the behavior of producers and consumers", thereby "producing 'playbor'" and "mak[ing] exploitation easier" [200]. Sharp and Thomas suggest that such utilitarian approaches to technology-mediated play reflects contemporary post-industrial culture: "in a culture that downplays emotions [...] it stands to reason that the culture as a whole looks down upon play and its affective productivity" [217].

There is a body of works that have explored alternative ways of designing for play, paying more attention to people's socio-emotional needs. For example, Gaver's "ludic design" [106] advocates for the design of ambiguous, open-ended technologies that elicit curiosity and encourage us to be explorative and playful in our ordinary routines, regardless of any productive outcomes. Sicart's call for playful alternatives to technical determinism [218] follows a similar agenda. Burkeman suggests that we could "allow the spirit of play to suffuse our telic tasks" [47]. Along those lines, Bogost proposes re-signifying everyday activities and treating "anything with the deliberate attention that produces fun" [38], transforming the world into a playground [38]. These works extend productivity-focused Playful HCI as they better account for the social and emotional potential of playful technology. They respond to societal values that, though unproductive from a material perspective, are highly relevant, such as promoting curiosity and exploration, facilitating social connection or, more generally, supporting emotional wellbeing. My research aligns with those works and intends to make their underlying values more present and actionable in HCI.

### **2.3. Designing playful technology: how?**

In the previous sections, I discussed the state of play in HCI and positioned my agenda of contributing to strengthening the body of socio-emotionally focused works within Playful HCI. Here, a methodological question arises: if we are to design technology that playfully enriches

people's day-to-day, how can we do it in ways that reflect the socio-emotional idiosyncrasies of the targeted design scenario? To begin to answer this question, here I discuss existing methods that might be useful to support that agenda. I begin with a theoretical description of games, play, and playfulness; understanding their differences is key to designing for play that intertwines with non-play activity. Then, I review mainstream approaches to play and game design, highlighting their potential and limitations. Finally, I echo recent calls for new methods in the broader spaces of Participatory Design, Interaction Design, and HCI to reflect on the limitations of current approaches and suggest the need for new methods that support the design of technology that allows play to permeate (and enrich) our lives.

### **2.3.1. Games, play, and playfulness: basic concepts**

The line between games and play is fine and blurry. Yet, their differences are important from a design perspective. Games usually rely on a predefined, clear, and well-set structure made of goals, rules, and challenges [207]. Play emerges within that structure as players embrace the game rules to find their way towards a successful outcome [21][228]. But play can also emerge outside of a game: it does not necessarily require the presence of challenges or clear outcomes [207]. Play is diverse: it can be simultaneously liberty, invention, fantasy, and discipline [52][233]. Although less clear than in games, there is also structure to play [21][239]. For example, when engaged in pretend play, children often come up with house rules, such as “you're out if a bomb (balloon filled with water) explodes on you (and you get wet)”.

Despite their differences, play and games share traits that are important when it comes to design: they are autotelic and self-contained activities. That is, they have a context of their own, separated from other non-play activities, where playing is at focus and at stake [52][218] and any non-play issues fade out. That separateness is often referred to as the “magic circle” [134][207]. Some have argued that the notion of magic circle is obsolete, as play and games

cannot be completely separate from the non-play world [60]. Yet this separation can be useful from a design perspective [229]: it allows designers to define the interplay between play and non-play activities and adjust it by design. When designing an autotelic play activity, whether a game or another kind, designers create a new context and a set of meanings, which are maintained and negotiated among players during the activity. These context and meanings are seen as exclusive to the play activity and separate from anything that is outside of the play domain [218]. In contrast, a good integration with the out-of-play world is essential when designing for non-entertainment play, where the magic circle of play blends into real life.

Play does not always need to be separate from ordinary, non-play situations we experience in our day-to-day. In fact, play and playfulness often emerge naturally in a variety of everyday situations [52][134][218]. Sicart's notion of "playfulness" characterizes that intersection well, i.e. "play outside of the context of play" [218]. It refers to a specific type of play experience, "just what attracts us, [...] without the encapsulated singularity of play" [218]. As opposed to play and games, playfulness is not an activity in itself, but an attitude other activities can be performed with. As such, it can coexist with activities other than play. Playfulness thus affords the many benefits of play in situations in which playing is not the only thing at stake.

The differences between games, play and playfulness are relevant to the design of playful technology aimed at activities that are not entertainment-based. When designing a game or any other kind of autotelic play activity, designers create a rather self-contained world from scratch that the player gladly inhabits. In contrast, this is not the case when designing for playfulness and other forms of mundane play. Playfulness moves beyond, or extends, the magic circle of a pure game, instead weaving itself into everyday life and activity. Thus, while taking the context of play and the users into account can of course be useful in game and play design, it is essential when designing for playfulness as situated and emergent within day-to-day activity. How can we support that playfulness by design? How can we design

“porous” magic circles of play that at the same time support autotelic action and embrace players’ contexts and lives? These are key design questions my research explores. In this section I review existing methods that can be useful in this space.

### **2.3.2. Methodological approaches to designing for play**

Here I look at how artistic, systematic, and player-centered perspectives on play(ful) design approach the interplay between designers, players, and the designed interventions. I review the repertoire of existing tools available to designers and highlight the need for new methods.

**Game design as artistic expression.** Videogames are often discussed as art and the role of designers as that of an artist [225]. As such, game design has traditionally followed designer-centric approaches [145] where design choices are motivated by the designer's desire for creative and aesthetic expression and grounded in their expertise and personal preferences (e.g. [203]'s approach to making “deep games”). That aligns with “romantic” perspectives on design [94], wherein the designer’s creativity and aesthetic judgment is emphasized over a methodologically sound, transparent, and well-articulated design process. While participatory game design approaches exist (e.g. [72][146][151][172]), they remain exceptions. Designer-centric approaches leverage the designer’s creative capacity to craft rich self-contained play experiences; however, they are less helpful when it comes to accounting for users’ needs and desires, let alone the idiosyncrasies of the contexts where they will play. Because of that, they might be most useful in the design of autotelic play, e.g. entertainment games, where play and non-play activity hardly intersect.

**Systematic approaches to game and play design.** While the artistic expression of games is undeniable, over the last years we have seen an increased body of works that systematize game and play design with the aim of better accounting for users' desires [217]. A clear

example of this turn from artistic to programmatic design is [207], which teaches game developers how to scaffold their design process and ground it in both best practice and empirically validated knowledge. A similar move towards systematizing game design is the “MDA framework” [135], which formalizes the components of gameful experiences to make game design more actionable. Interestingly, the “MDA framework” is often used beyond the space of videogames, to guide the design of non-entertainment playful interventions, e.g. in gamification. Another form of systematic play design is player taxonomies, aimed at helping designers to understand players and their preferences. Examples abound: Bartle’s taxonomy of player types segments MMO players depending on their gameplay preferences [23]; Kim’s “social action matrix” provides a list of social verbs relevant to player motivation [148]; Marczewski’s player types extend Bartle’s work by including users that are not willing to play [241]; Bekker’s and Antle’s developmentally situated design cards provide information about the cognitive, physical, social and emotional abilities of children [24]. Other tools formalize playful experiences into conceptual models, e.g. Lazzaro’s “4 Keys to Fun” [153] sorts playful experiences according to their emotional impact. Systematic approaches to play design align with a “conservative” view on design [94] wherein the designer takes the role of an expert and leverages that expertise to structure the design process around theoretical or best practice knowledge. That approach helps designers make high-level, grounded choices about the play experiences they want to create. Yet, it can fail to account for the idiosyncrasies of real design scenarios and making these theory-motivated ideas meaningful in real life.

**Player-Centered Design.** Other approaches take a strong user-centered stance [1], thus aligning with a more “pragmatic” perspective of design [94]. They take a step further than systematic approaches by including final users in the design process to create bridges between abstracted (e.g. theory and best practice) and local (e.g. users’ preferences) knowledge. In game design, a well-known example is [101], which provides actionable

strategies to involve players in the design of games that respond to their needs and desires. Similarly, several of the lenses within [211] are prompts to scrutinize games from the players' perspective. Various literature from game UX (e.g. [29][138]) also suggests ways of including users in the design process. In play design beyond entertainment games, a few frameworks also embrace a more open-ended, less systematic perspective of design. For example, the "PLEX framework" [20] presents a combination of a design-oriented taxonomy of playful experiences and a series of user-centered strategies to use the taxonomy to conduct user research. With a stronger focus on embodiment, the work of [142][168] in the domain of co-located play for social good is also inspiring. They present valuable "social affordances"—i.e. pro-social behavior that is encouraged and supported by design elements—for technology design inspired by or targeting play design. User-centered frameworks of play and game design provide conceptual tools that help designers rationalize their creative process and refine ideas. However, they offer less guidance about how to leverage the context where play unfolds in design, especially in early design phases prior to concept design. A noteworthy example is the "Four Lenses of Play" [25], a "toolkit for designing playful interactions" that offers a series of lenses to inform play design. According to that framework, play design starts with ideation, where designers frame the scope of the project. That is followed by a middle design phase, where key design decisions are made by designers. Finally, in the later phase of the process, interaction rules are refined through iteration with users. Though player-centric, in the "Four Lenses of Play", the "PLEX Framework", and similar frameworks the design process still depends more on theory and designer's expertise than on multi-stakeholder participation. Users are often involved when design ideas are already defined, and a somewhat testable prototype developed—hence, leaning more towards relegating multi-stakeholder decision-making to "small" (i.e. superficial [39]) decisions that build on top of the "big" (i.e. highly consequential [39]) ones made by designers themselves.

Looking at the current landscape of methods available to play designers, there is a need for more strategies that help designers to engage stakeholders in more depth and earlier in the design process, so that resulting playful innovations are contextually meaningful and socio-emotionally sound. Including stakeholders late in the design process can work in the design of autotelic and self-contained play activity—there, contextual knowledge is less relevant as play hardly intervenes in people’s ordinary, non-play world. However, including stakeholders early in the design process is essential when designing for play beyond games, in contexts where a porous magic circle that intertwines play and non-play activity is sought. That begs the question of: how do we engage stakeholders to co-define the very foundations of a novel playful technology, rather than allowing them to only polish concrete aspects of in-progress designs? In the next section, I discuss how Participatory Design inspires us to do that, and to what extent existing PD methods are well suited to support playful design.

## **2.4. From participatory design to bottom-up playful design**

As seen above, mainstream play design approaches hardly involve stakeholders as creative partners. Even the more player-centered methods, both in game (e.g. [101]) and play design (e.g. [25]), relegate user involvement to polishing advanced ideas in late phases of a project. If included earlier in the process, users are often seen as sources of inspiration rather than active contributors of ideas. That is a missed opportunity when it comes to leveraging their creative capacity and drawing on their rich knowledge of their context and needs.

Play designers could be inspired by Participatory Design’s (PD) [88][184] longstanding tradition of using multi-stakeholder engagement as the core driver of design processes [126]. PD extends user-centered practices by including users earlier in the design process, before ideation starts, and treating them as “creative partners” [85]. It supports multi-stakeholder negotiation over foundational aspects of a design, rather than limiting it to minor decisions,

and thus enables more bottom-up, contextually sensitive, and democratic innovation. PD offers numerous strategies to understand how people act in their day-to-day and involve them in the design of interventions that fit their idiosyncrasies, e.g. Druin's involvement of children in technology design [85]. Interestingly, apart from notable exceptions like "cultural probes" [103][108], existing participatory techniques do not necessarily focus on designing for play. PD has traditionally served other design agendas than crafting compelling play experiences [126][184]. That creates a tension when it comes to using it to support play design, where designers are primarily concerned with play and playfulness rather than on creating usable accessible, or democratic solutions—which has traditionally been the focus of PD [126][184]. To better support increasingly situated and participatory play design practices, there might be a need for new methods that shift the focus from what users do, to how they engage playfully.

Recent calls advocate for re-imagining Participatory Design and broadening the set of tools available to designers [22][32][34]. The world has changed significantly since the rise of PD in the 1970's, and the kinds of issues addressed by technology designers have changed as a result—the "third wave of HCI" is a clear example [33]. The breadth of challenges tackled by participatory designers is expanding, and PD methods should be updated to reflect that [34]. [22] suggests a few directions for methodological advancement: First, enlarging the set of tools available to designers to adapt to the increasing diversity of areas of application of PD. Second, embracing a more flexible understanding of participation, where users are involved in different ways depending on the needs of a design project. Third, reclaiming foundational values of PD that have progressively lost traction, e.g. the idea that PD should not only lead to tangible innovations or academic knowledge, but also to a transformation in participants' lives. Fourth, creating mechanisms to empower people to appropriate and even modify design interventions after the design process finishes—what [32] calls "design after design".

My research echoes those calls, as well as other calls for extending the palette of co-design methods available in interaction design and HCI [251]. Building on them, I see a need to create stronger bridges between participatory and play design practice and figure out how to involve diverse stakeholders as creative partners in the design of playful innovations that are contextually sound. Given the inherently situated nature of playful engagement, designers will benefit from embracing increasingly participatory and situated approaches in their work. The methodological dimension of my contribution (Chapters 4 and 7) aims to support designers to do that: I propose new tools and strategies that might help designers involve stakeholders and their context as key drivers of playful design process that are more bottom up.

## Chapter 3

# TECHNOLOGY FOR SITUATED AND EMERGENT PLAY: A BRIDGING CONCEPT AND DESIGN AGENDA

In this chapter, I present the conceptual contribution of my research: an intermediate knowledge piece [159] that addresses the question: “How can playful technology support us socially and emotionally, and why should technology designers pay more attention to that potential?” This contribution responds to one of the struggles I experienced as a designer before starting my Ph.D.: I struggled to motivate the design of technology that afforded non-entertainment play for other reasons than stimulating productivity. As shown in Chapter 2, upon review of relevant literature, I realized that other designers have also experienced that struggle. Despite the vastly investigated capacity of play to spontaneously emerge in our daily life, its scope of application in HCI is generally narrower and dominated by productivity-focused approaches. Though alternatives exist, I see a need to foreground more the value of play as a source of rich socio-emotional experiences.

To respond to that need, I worked on bringing together, synthesizing, and making accessible a body of literature that discusses the value of play as a fundamental aspect of human life. I also explored how technology could incorporate some of play’s desirable qualities to better respond to people’s socio-emotional needs. The resulting “bridging concept” [69] frames and shows the potential of the design space of “Technology for Situated and Emergent Play”, i.e. technology design that supports playful engagement that emerges interwoven with our everyday activities outside leisure, and that enriches these activities with socio-emotional value. It weaves together theories of play and play design and bridges them with concrete design exemplars. This work was published at CHI '20 as a full paper [10]; while I am the first author of the paper, it was done in collaboration with my advisor Katherine Isbister and my colleague Elena Márquez Segura.

Below, I present the different components of this contribution: First, I describe the scope of the bridging concept and the method used to develop it (3.1), as well as a series of relevant related works (3.2). Following, I present the two design articulations: first, a set of experiential qualities of play that, according to the literature, are socio-emotionally desirable (3.3); then, a set of design features that can inspire future playful technology design in directions that are increasingly rich from a socio-emotional perspective (3.4). Finally, I discuss the relevance and limitations of my contribution (3.5). Overall, this work will help to foreground the value of designing for play that responds to people's socio-emotional needs, regardless of productivity agendas, and will make that agenda more actionable for technology designers.

### **3.1. Scope and method**

“Bridging concepts” are intermediate-level knowledge forms residing at a level of abstraction between theory and practice. They facilitate the exchange between the two by “articulat[ing] untried design opportunities and potential theoretical advancements” [69]. The bridging concept I am presenting here, “Technology for Situated and Emergent Play”, is meant to make accessible a body of theoretical and design knowledge that can inspire designers to create playful technologies that better respond to people's social and emotional needs, in ways that are currently under-represented in HCI. Its name was derived from two important traits of mundane playfulness: First, it is “situated” in non-play contexts and intertwined with non-play activity, and is therefore contingent on the idiosyncrasies of non-play scenarios. Second, it is “emergent”, i.e. it unfolds organically as people playfully re-ambiguate mundane situations. To unpack this design space and illustrate its potential, I produced a bridging concept that has both synthetic and inspirational value: it weaves together theories about the socio-emotional importance of play and a set of concrete, illustrative, inspirational design exemplars that represent those theoretical concepts. As a bridging concept, this contribution is grounded in the three necessary components according to [69]:

**Theoretical grounding:** it synthesizes a theoretical foundation that highlights the importance of play and playful engagement in human life and illustrates how it can contribute to our individual and collective well-being. The theoretical foundation weaves together theories from within and outside of HCI, including areas such as: game studies, sociology, philosophy, play and game design, cultural studies, psychology, and more.

**Design exemplars:** it presents a collection of 13 inspiring technology design exemplars and uses them to illustrate the theory. These exemplars make accessible the key ideas from the literature, i.e. they make tangible some of the positive effects playful engagement can have in human life and show how designers can incorporate them in their technology innovations.

**Design articulations:** it presents two insights that emerged as I bridged the theoretical foundation and the design exemplars. First, three valuable experiential qualities of play that can be afforded by technology, which emerged from a review of play scholarship and are illustrated through particular technology designs. Second, an analysis of the design exemplars that highlights five recurrent design features; we argue they can help to focus design agendas for playful technology and inspire the design of Technology for Situated and Emergent Play that better responds to people's socio-emotional needs.

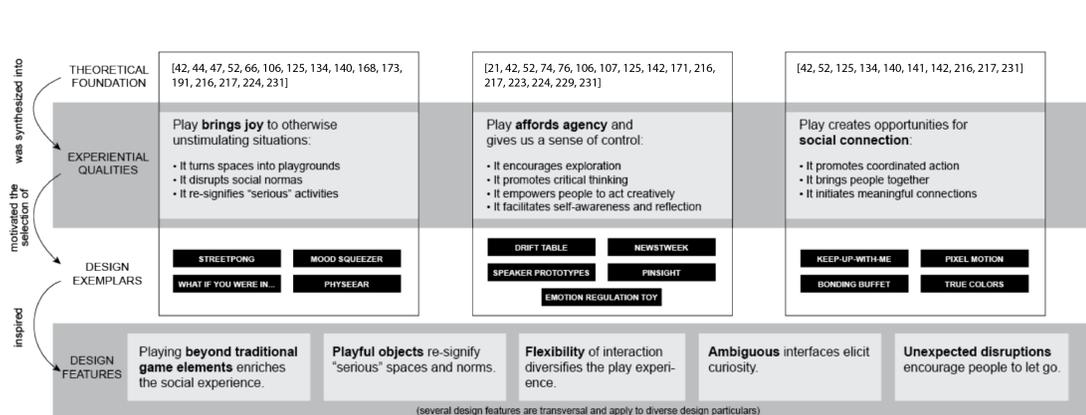


Figure 2. The 'Technology for Situated and Emergent Play' bridging concept and its constituents: the theoretical foundation; two design articulations (experiential qualities of play and design features); and the design exemplars.

Bridging concepts can be created bottom-up (i.e. starting with a “strong concept” [132], grounded in design exemplars and later linked to theory) or top-down (i.e. starting with conceptual constructs, later concretized with design exemplars). Mine was created through a top-down approach (see Figure 2), to make accessible a set of relevant theories to designers. Consistent with that approach, I deliberately chose exemplars that could help illustrate and concretize those theories. I reviewed a diverse range of scholarship related to play that: (a) is well rooted in real-life activity and supports—rather than disrupts—going about one’s life without having to step out of everyday business; (b) emerges, is flexible, open, and player-motivated; and (c) enriches mundane activities and has socio-emotional value for the player. These foci narrowed down my search of literature and design exemplars.

To distill the design articulations, the research team began by conducting a thematic analysis of the literature, compiling it to identify emerging themes. We clustered our findings into three experiential qualities of play that support desirable societal values. Then, we searched for inspirational design practice showing how playful technology might support people socio-emotionally. We selected 13 design exemplars for how they resonated with the experiential qualities we found in the literature. Finally, our analysis of the design exemplars surfaced 5 recurrent design features that can inspire future technology designs that leverage the socio-emotional relevance of play. In sections 3.3 and 3.4 I present the outcomes of that synthesis work, i.e. the design articulations of the bridging concept.

### **3.2. Inspirational collections and intermediate-level work**

My contribution resonates with existing works, e.g. “slow technology” [125] or “somaesthetics” [130], that explore how tech can contribute to making our lives worth living. In particular, it adds to works focused on everyday play (e.g. [6][38][106]) and its socio-emotional capacity (e.g. [141] [218]). As noted in 2.1, previous research has explored this space and proposed

relevant design features. My work adds to existing contributions by bringing them together, weaving them with theories from outside of HCI, and instantiating that corpus of knowledge with real design exemplars. Here I highlight existing research that relates to my work:

Sicart's "Play Matters" [218] stresses the importance of everyday play as a key part of human life. Despite its theoretical focus, it illustrates ways in which play matters through inspiring descriptions of real designs. It also shares ideas that are key to understanding the porous nature of playfulness, "an attitude that allows us to experience play in activities that are not play" [218]. From games and play design, Isbister's "How Games Move Us" [141] examines the socio-emotional relevance of games and shows with examples the benefits of social, co-located, and physical play on people's emotions. From interaction design, Gaver's "ludic design" [106] shows how playful interfaces can afford curiosity and exploration and offers insights on how to design them. Hoby's dissertation [128] proposes design-led strategies to support explorative and performative play in social contexts. These and other works show concrete values of play as a social good, e.g. Isbister et al.'s social affordances of play [142]. Some also unpack design strategies to promote specific kinds of playful engagement, e.g. Gaver et al.'s ambiguity as a useful resource in interaction design [107]. My work builds on and synthesizes these contributions, in combination with others from outside of HCI, to highlight a series of desirable experiential qualities of play that are relevant in this design space. The design cases, and the recurrent design features they present, concretize those theories and make them more tangible so that they are actionable from a design perspective.

### **3.3. Experiential qualities of play: how can playful technology afford socio-emotionally desirable experiences?**

In this section, I present the first design articulation of the bridging concept: a series of experiential qualities of play that are socio-emotionally desirable. As discussed in 2.1, Playful

HCI often gravitates towards leveraging the motivational power of games and play in service of productivity [217]. But there are other values that play design can bring to society beyond performance and productivity—they have been vastly investigated, in but especially outside of HCI. To make that theoretical foundation more accessible and actionable for designers, here I look at play scholarship to foreground, unpack, and illustrate three qualities of play that can be considered socio-emotionally desirable: (1) it brings joy to otherwise unstimulating situations; (2) it empowers us to have agency on whatever we do; and (3) it promotes social connection. To ground these qualities and make them tangible, I introduce a series of design exemplars, i.e. concrete technology designs that serve to illustrate these qualities.

### **3.3.1. Play brings joy to otherwise unstimulating moments**

One of the most obvious effects of play is that it generates positive emotions [42]: it is intensely pleasurable; it speaks to our inner desire of joy and stimulation; it can be a source of fun and laughter; it can make us thrive. Here I discuss three ways in which playful technology could bring us joy: i) turning serious spaces into playgrounds; ii) disrupting socio-cultural norms; and iii) re-signifying activities into playful ones.

It is commonly said that, when playing, “time flies.” Play is a “cure for boredom” that “eases our burdens” [42]: it puts us in a state of flow where we profoundly enjoy whatever we are doing [66]. Playful technology can help us season the countless playless situations we often experience every day by turning spaces into playgrounds. An example is “StreetPong” [91] (Figure 3A), a touchscreen device attached to traffic light poles that allows pedestrians to play Pong with one another while waiting for the green light. It turns a seemingly long wait into an opportunity for fast-paced social competition. Similarly, “What If You Were In...” [2] (Figure 3B) can make waiting at train level crossings more enjoyable by offering passersby a chance to escape and travel elsewhere. People can send a text choosing a place where they



Figure 3. Playful technologies that are a source of positive affect. A: StreetPong [91]. B: What If You Were In... [2]. C: the Mood Squeezer [103] spheres and LED floor. D: inpatient and a caregiver interacting with PhySeEar [166].

would rather be, and a screen will feature them at the desired location. Both designs show how playful technology can re-signify “serious” spaces, turning boring situations into stimulating experiences that “enliven us” [42] and make time fly. They create a porous magic circle of play that, while not removing players completely from the situation, is experientially rich and gives them a chance to detach from feelings of boredom and frustration.

Playful tech can also help us re-frame the social norms that regulate our routines. “Serious” contexts, e.g. workplaces or a medical settings, tend to not only discourage play, but at times also self-expression and social bonding—both considered basic human needs [42]. Through play, we can reclaim those needs, create space for self-expression [171], and “personalize the world, making it ours while still acknowledging that it has a purpose other than playing” [141]. An example is “Mood Squeezer” [103] (Figure 3C): it allows people to express their mood by squeezing colored balls, which light up a colorful LED floor. Designed to “provide an injection of playfulness” into the workplace [103], it brought about relevant results: it improved the quality of conversations, becoming an “ice-breaker in awkward situations”; it helped people be “more open about how they felt”; and “it liven[ed] the place up” while keeping it productive. In fact, inviting frivolous play [233] in serious settings can lead to more productive and satisfying work [173]. In “PhySeEar” [166] (Figure 3D), a robot designed to assist in rehabilitative physical exercises was also used to improve the experience of inpatients and physiotherapists. Building on the robot’s behavior, they could playfully re-signify the sessions by siding together and antagonizing the robot, blaming it for the negative aspects of their

personal roles and performance. For example, the robot (rather than the therapist who had ultimate control over it) was playfully blamed for being too strict when providing feedback; or the robot (rather than the inpatients whom it mimicked) was playfully blamed for negative aspects of the physical performance. A study [166] revealed that playing with the robot led to positive physical and socio-emotional results: it strengthened bonds between inpatients and therapists and brought about intensified engagement with the therapy.

The above design exemplars illustrate the relationship between play and emotional wellbeing: it can make our lives more joyful, make otherwise meaningless activities worth experiencing, and help us engage fully with the world [42]. As “PhySeEar” and “Mood Squeezer” show, that does not need to be at odds with productivity. Stimulating rich socio-emotional experiences can lead to increased motivation as a side effect.

### **3.3.2. Play gives us agency**

Another relevant experiential quality of play is that it gives us agency—it allows us to choose, act, and express ourselves in ways that are meaningful [217][218]. That can be very valuable in a world where people are increasingly busy and reliant on larger structures, which can provoke a feeling of lack of control of one’s life [232]. Here I surface 4 ways in which playful technology can afford agency: i) encouraging us to explore; ii) promoting critical thinking; iii) empowering us to act creatively; and iv) supporting self-awareness.

Re-framing situations as playful can spark curiosity, help us embrace uncertainty, encourage us to explore the unknown [153][228], and open new avenues of action [52][224]: “as we toy with things and ideas, as we chat and daydream, we find new perspectives and new ways to create, new ambitions, relationships” [106]. “Ludic design” [106] achieves that through the design of ambiguous [107] technologies that invite open-ended, self-guided exploration. For



Figure 4. Playful technologies that afford exploration. A: the Drift Table [109]. B: the Speaker Prototypes [241].

example, the “Drift Table” [109] (Figure 4A) is a table that displays moving aerial footage mapped to the weight distribution of objects on its surface. Users can navigate across the footage by positioning parts of their body on the table. This design is not meant to serve any productive agenda—it simply offers a chance for people to explore freely without an apparent purpose. A study revealed that people used it “as an occasional break from their routine household activities” to “satisfy their curiosity and to wander, without feeling that it should be useful or utilitarian”. It augmented the experience of being around the table, “encourage[ing] the exploration of new activities and appreciations” [109].

The “Speaker Prototypes” [241] (Figure 4B) were also designed to explore how to promote self-guided playful exploration, in this case in public spaces. The speakers respond to human presence and produce sounds that create “a situation that is clearly out-of-context” to “evoke curiosity through novelty” and invite people “to make sense of the situation” [241]. A study showed that “passers-by tried to find out ‘how the system worked’ and while doing this they discovered additional ways of interacting” [241]. People “started discussing what they thought about the system, what they had heard from others, and so on” [241]. The “Speaker Prototypes” show how playful tech can prompt people to explore, individually and collectively, and experiment with new ways of engaging with space and with others.



Figure 5. A news outlet, hacked through Newstweek [191].

By affording exploration, play can also promote critical thinking [122]: it help us re-claim our desire to act in non-formulaic ways and break up entrenched social and cultural norms [76] [118][229]. That is a desirable value that society should cultivate—it empowers autonomous thinking and gives us a chance to disrupt the state of affairs [218][228]. Playful technology can afford that: “Newstweek” [191] (Figure 5), as described by Sicart in [218], promotes critical thinking by enabling users to hack into wireless hotspots and manipulate the content of the news feeds read by people around them. It offers average citizens a chance to “have their turn to manipulate the press; generating propaganda or simply 'fixing facts'” [191].

But play not only promotes exploration and critical thinking, it can also empower us to act upon the world that surrounds us [218]. Play cultivates creative ideation [144]: “as we play, we think about thinking, and we learn to act in new ways” [253]. That is, in part, because it is both appropriative and disruptive: it takes over the context where it happens and challenges the state of affairs [218], allowing players to appropriate situations to suit their needs [21][74]. Playfulness brings freedom to a context without disrupting it completely [218], which brings about the right conditions to create [228]. “Pinsight” [158] (Figure 6) is a playful technology that supports citizens to create and curate the content of tourist information points within their city, allowing them to have a (playful) say in their city’s public image [158]. A study showed

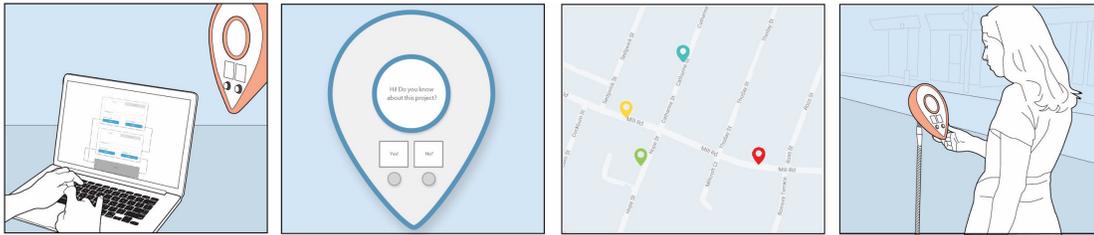


Figure 6. Basic functioning of Pinsight [158]. Left: how to add content to a Pin. Center-left: a Pin. Center-right: Pin locations on a map. Right: someone interacting with a Pin.

that allowing people to become content creators led to richer connections between them and audiences (visitors): “participants were able to put themselves in the shoes of the public who might come across their content” [158]. Although they were not asked to write playful messages, that happened naturally: “most dialogues [...] had elements of wit and humor, for example, one person wrote a question: ‘Do you know who lives next door?’ with two possible answers: ‘Can’t get rid of them!’ and ‘Never seen them!’” [158]. “Pinsight” shows how play “renews our natural sense of optimism and opens up to new possibilities” [42]: it prompted neighbors to collaborate by sharing “ideas, jokes, local history and local knowledge” [158].

Play’s capacity to promote critical thinking is a wonderful way to connect with, be aware of, and reflect upon ourselves and our actions. It has significant power over our character [122]: it exposes us to our contradictions, reveals “the truest expression of our individuality” [42], and exposes parts of ourselves that we often take for granted [218]. As such, it is deeply relevant to human flourishing. Through play, we temporarily become whoever we want and act however we like, and by “being outside of [ourselves] amongst the movements of play” [64] we reveal our desires and instincts [109] from a “dimension of experience that’s between the subjective and the objective” [64]. By making us curious, play helps us to be proactive [173] and make sense of the world we live in [228]. It affords a safe space where we can re-ambiguate life and learn about it without putting ourselves at risk, transforming uncertainty into opportunities for learning and development [228]. That potential of play to promote self-awareness is very relevant to HCI—it can help us design technologies that not only improve

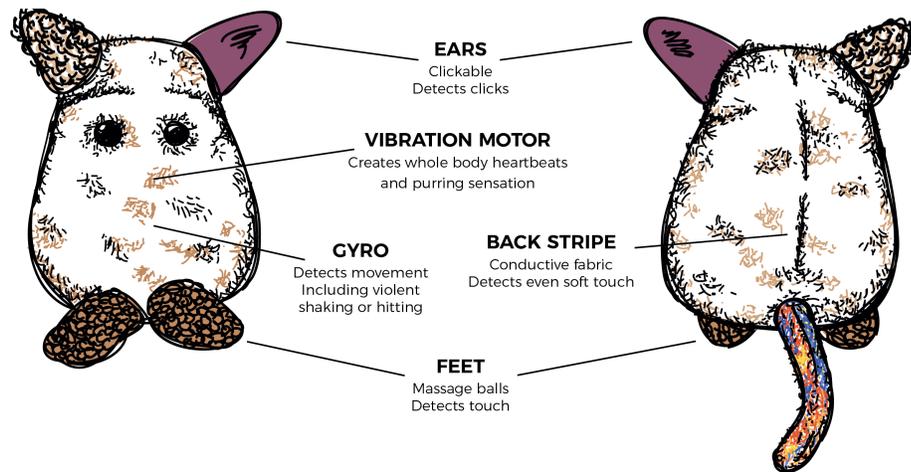


Figure 7. The Emotion Regulation Toy's [223] components.

experience, but also support reflection [106]. The “Emotion Regulation Toy” [223] (Figure 7) illustrates that: it helps children calm down when they are anxious and learn to manage their own emotions through a subtle haptic that mimics a rapid heartbeat. The toy invites children to soothe it, hugging and patting it through simple fidgeting interactions [223] that are known to contribute to positive emotions and relaxation [102][243]. A study demonstrated that play-acting taking care of the creature invited figuring out what is “wrong” with it, which helped children to better identify, understand, and deal with their negative emotions [223].

### 3.3.3. Play supports social affordances

A third experiential quality of play is that it supports pro-social behavior [142][168]. This is relevant to HCI, as “social interaction is deeply consequential to human flourishing” [141]. It is also particularly important in a contemporary society that suffers from an increasing lack of meaningful social connection [147]. Some argue that technology might contribute to that issue, e.g. through screen-based interactions that distract people from co-located social interaction [127]. But technology does not necessarily need to isolate us. In fact, it can—and should—support and enrich our social lives. Play can be a useful strategy to do that, as it is known to have “a positive impact on the well-being of both individuals and groups” [134].



Figure 8. The Keep-Up-With-Me table [178]. The left plate is lower because the owner is eating faster.

Here I discuss three ways in which technology can support social affordances: i) promoting coordinated action; ii) bringing people together; and iii) initiating meaningful connections.

Coordinated action makes people feel more connected and leads to mutual liking [141]. Tech can promote that, e.g. “Keep-Up-With-Me” [178] (Figure 8) enriches shared meals by promoting synchronized eating. Based on the amount of food left on the plates, these are lifted and lowered by a mechatronic table, augmenting cues people often use to pace their eating and balance it with social communication. The table creates a playful disruption that invites (rather than forces) diners to be more aware of each other in a bizarre yet fun way.

Play can also help people to get together [141]. That can be desirable in many situations where we share a physical space but do not interact directly, where we are alone, surrounded by strangers, and could benefit from the pleasure of social connection. “Bonding Buffet” [222] (Figure 9A) is an interactive installation designed by KLM Airlines to bring people together at airports. It consists of a dinner table surrounded by 20 chairs that can detect when people sit on them. When seats are not occupied, the table is lifted off the ground, making it difficult to see what is on it, and even to realize it is a table. As more people sit, the table lowers down, reaching the optimal height when all chairs are used. Bonding Buffet aimed to help strangers connect and enjoy each other’s presence: “Every day, KLM flies thousands of passengers to all corners of the world [...]. But how do you ensure that people really sit down at a table



Figure 9. Playful technologies that bring people together. A: people sitting around the Bonding Buffet table [222], inviting others to sit. B: two persons playing with Pixel Motion [201].

together, engage with one another and share with each other?" [222]. According to a report, the mystery of discovering what was going on with that weird structure, the challenge of bringing together enough people to lower the table, and the reward of a shared dinner prompted people to come together: "People really enjoyed their time together at the table, with all sorts of new contacts emerging. It was so much fun that we had to remind some of the guests that they had flights to catch!" [222]. "Bonding Buffet" shows of how playful tech can bring us together and focus our attention on each other, instead of adding social barriers, which is a common criticism of technology use during meals [127]. "Pixel Motion" [201] (Figure 9B) is another installation designed to bring people together, in this case at a museum hall. It consists of a projection displayed on one of the walls of the hall, showing an opaque image overlaid to (and hiding) another. The image reacts to presence and movement: passersby can interact by wiping off areas of the opaque layer. Once the underlying image is uncovered, a photo of participants is taken as a reward. A study showed that the installation connected strangers: "out of the 240 rounds observed, only a few were solo play, and approximately 85% of these in the presence of others" [201]. Seeing others play drew people to join: "when [...] visitors were standing to watch the display, their presence would tend to encourage other visitors, related or otherwise, to follow suit" [201].



Figure 10. A wearer of True Colors [67] experiencing an overload (left) and a non-wearer helping overcome it (right).

Play not only brings people together: it also creates the right conditions to initiate meaningful connections. “True Colors” [67] (Figure 10) is a social wearable used in the diegetic universe of a “live action role play game” (LARP). The wearable gives special abilities to the wearer (e.g. stunning others), but it periodically puts them into a diegetic state of vulnerability (i.e. a “health crisis”) that can be alleviated by co-present others through social touch on the back (i.e. reducing the time of “crisis”). A study revealed that this mechanism resulted in rich and unexpected social interactions [67]. Wearers barely used their attack function; instead, they enjoyed the moments of crises as they urged non-wearers (even those taking antagonist roles in the LARP world) to initiate contact and gather and help in times of need. That was perceived by players as an important tool to initiate and deepen relationships.

“Keep-Up-With-Me”, “Bonding Buffet”, “Pixel Motion” and “True Colors” share a trait: they create the right conditions for social situations to emerge [141], inviting positive social and emotional action, and allowing those involved to enjoy the pleasure of meaningful social connections. These are desirable social goods technology should cultivate.

### **3.4. Design features: designing technology for situated and emergent play**

Here I present the second design articulation: 5 recurrent design features I found in the analysis of the collection of exemplars described above. I present them as actionable advice that can inspire the design of future “Technology for Situated and Emergent Play”.

#### **3.4.1. Playing beyond traditional game elements enriches the social experience**

A recurrent quality in this collection of exemplars is that they hardly make use of traditional game elements (points, levels, etc.). They avoid the “aesthetics of meaningful choice” [217], or play-as-progress and play-as-problem-solving models that are common in Playful HCI. Instead, they embrace a broader and more flexible idea of play. Even “Pixel Motion” [201], framed as a “public digital game,” proposes a short and fast-paced experience that focuses players on moving their bodies together rather than on progressing through a game. Instead of using scores or progress-oriented rewards, it focuses on “shaping relationships between players”, which is known to be a powerful way to craft rich collocated play experiences [142]. “StreetPong” [91] also moves the focus away from progress to emphasize the social quality of the situation. Like in “Pixel Motion”, the experience does not transcend the scope of a round (e.g. through a ranking); instead, the reward is the very act of crossing paths with a stranger with whom you just played. These examples illustrate how playing beyond traditional game elements might be an interesting strategy to promote joyful moments of social interaction.

#### **3.4.2. Playful objects re-signify “serious” spaces and norms**

Many exemplars in the collection inhabit mundane spaces and integrate into contextual objects. Embedding playful artifacts in “serious” spaces can support re-signification of those spaces and their inherent cultural norms [128]. That re-appropriation can take different forms:

First, some exemplars disrupt the state of affairs in “serious” situations by augmenting key infrastructure to turn a space into a momentary playground, e.g. “StreetPong” [91] adds a game interface to traffic lights to prompt passersby to act playfully. Others augment everyday objects to re-signify mundane activity, e.g. the “Keep-Up-With-Me” table [178] turns the action of putting food into one’s mouth into a playful and social act. Its creators stress the potential of building on existing actions to playfully reframe a situation: “the activity of collecting food from the dish was the point of departure. This very aspect is crucial to successfully empower or enrich existing practices of eating, in contrast to imposing technology or augmenting objects with additional functionalities” [178]. My methodological proposal to identify play potentials (i.e. existing contextual interactions that are, or have the potential of becoming, playful) and use them as design material aligns with this idea (see Chapter 4).

Second, we see technology-augmented objects that promote playful behaviors without directly disrupting the activities taking place in those situations. For example, “Mood Squeezer” [103] promotes playful behaviors to encourage rethinking cultural norms, but it does that at times of the participants’ choosing, in a way that it does not interfere directly with the ordinary activities taking place at the office. The “Drift Table” [109] follows a similar principle: it allows people to interact with the virtual footage whenever they want, but it does not prevent them from ignoring the technological augmentation if they choose to.

Finally, we see designs where promoting a playful re-appropriation of an activity supports the “serious” actions expected in that activity. Those examples introduce technology as an object that is instrumental for the activity. For example, in “PhySeEar” [166] the robot plays a key role in the therapy (e.g. guiding and giving feedback about movements) while also supporting collective playful re-signification (e.g. its anthropomorphic looks and strict behavior support antagonizing and taking sides, or its clumsy movements support teasing [166]).

### 3.4.3. Flexibility of interaction diversifies the play experience

Flexibility of interaction can lead to a richer palette of play experiences. It affords multiple ways of engaging with—and through—technology and gives people a chance to experience it in different ways. It also allows play to transpire alongside, or within, non-play activity, supporting and augmenting—rather than disrupting—the in-the-moment engagement with that activity in a playful way. In the collection of exemplars, that can take different forms:

First, affording the emergence of user-driven, contextually meaningful interactions. Rather than imposing specific ways of interacting, “Keep-Up-With-Me” [178] allows people to find their own ways of being playful (e.g. collaborate to eat comfortably, compete to finish first, prank each other...). The “Drift Table” [109] can also be interacted with in different ways, even when people use it simultaneously. That flexibility facilitates appropriation: “people found their own means to accommodate the table to their own routines” [109]. Creating space for playful appropriation can help promote “improvisation and performance” [142]. Empowering people to playfully appropriate the experience rather than imposing a specific way to play allows them to engage in ways that feel meaningful and align well with their ordinary tasks.

Second, allowing players to jump in-and-out of the play experience easily. “Pixel Motion” [201] blurs the difference in the roles of players and spectators by allowing people to participate by simply being present in the space. It creates a porous magic circle that allows people to engage in different ways and with varying levels of commitment. According to a study, that “fluid boundary between player and observer [...] seemed to reduce the barrier to participation” [201]. Porous magic circles create the right conditions for exploration, e.g. “What If You Were In...” [2] allows passersby to choose between walking closer and being featured on screen or staying at a distance and watching others “travel where they would rather be”. Both “Pixel Motion” and “What If You Were In...” create opportunities for different

levels of engagement depending on people's intentions and allow them to modify their role as the experience unfolds. By embracing varying levels of commitment, they increase the chances that not only those who are naturally attracted to play participate. They also make the experience visible to (and intriguing for) spectators, which is known to be an interesting strategy to attract new participants in co-located play experiences [142].

#### **3.4.4. Ambiguous interfaces elicit curiosity**

Ambiguous interfaces promote explorative engagement [107] through internal complexity [128]. This design feature has been extensively explored before in HCI, especially by Gaver et al. [107], who proposed different ways ambiguity can be used as a design resource. In my collection of playful technologies, there are different kinds of ambiguity represented:

First, the “Drift Table” [107] creates “ambiguity of relationship” [107] between users and technology, disrupting the common uses of a table and offering new ways of interacting with it. As a result, it affords playful engagement: “in deliberately withholding a clear interpretation or narrative of use,” it allows “people to find their own meanings and uses for it” [109]. “Mood Squeezer” [103] does not provide clear instructions either: it invites people to express their mood by squeezing a colored sphere of their choosing. That ambiguity allows people to interpret freely, which creates opportunities for casual social interaction: “the deliberate open-ended mapping between mood and color often acted as a point of discussion” [103]. “Mood Squeezer” also uses “ambiguity of context” [107]: it brings an object that is clearly playful—the squeezey spheres—to a “serious” context, creating a tension that draws people to interact and facilitates a playful re-signification of the space. Finally, playfulness can also derive from “ambiguity of information” [107], e.g. “Newstweek” [191] allows people to disrupt the contents of online news feeds and create inconsistencies in the information, prompting others to interpret the causes behind those inconsistencies and reflect on their own position.

### **3.4.5. Unexpected disruptions encourage people to let go**

The last recurrent design quality in the collection is the use of spontaneous disruptions to facilitate the emergence of play, make people curious, and encourage them to participate. The “Speaker Prototypes” [241] illustrate how estrangement can stimulate playfulness and spice up otherwise unstimulating scenarios: “by creating a situation that is clearly out-of-context” it “evokes curiosity through novelty.” The idea of using a strange, unexpected situation to attract people is also key to “Bonding Buffet” [222]. In this case, the playful disruption has additional effects: it brings people together and encourages them to initiate contact. That is also true for “True Colors” [67], which periodically puts the wearer into a diegetic state of vulnerability that opens a window of opportunity for social engagement: non-wearers can offer their help as a starting point for a connection. “Mood Squeezer” [103] also uses oddity to bring people together, attracting people through a series of out-of-context spheres that can be squeezed—an interaction that can be seen as pleasurable. The spheres disrupt the common setup of the office and call to action by presenting themselves as a new and exciting thing: “They reminded [people] of childhood toys [and] engendered feelings of being light-hearted. It encouraged them to spontaneously be playful” [103].

### **3.5. How can this bridging concept inspire design?**

The experiential qualities in this bridging concept are in alignment with important societal values. They synthesize ideas, extensively discussed by play designers and theorists, that might not have yet been fully embraced in HCI. The bridging concept positions play as a desirable social good, and illustrates ways in which playful technology can add value in many areas of human life by positively impacting both individuals and groups. In a world where technology is increasingly present, designing to exclusively respond to productive agendas can have profound negative effects, as it neglects experiences that are key to our well-being.

While being productive is an important dimension of human life, it is (at least) equally important to take care of our socio-emotional needs [47]. Surely, technology can help us be more productive, but it should also augment the in-the-moment experience of our daily lives. That leads us to back Burkeman's concern that rejecting productivity in favor of play can be a radical act [47]—while that might be true today, why should it be? Brown argues that “remembering what play is all about and making it part of our daily lives are probably the most important factors in being a fulfilled human being” [42]. This bridging concept suggests that Technology for Situated and Emergent Play can help us to do that, encouraging and supporting us to be playful every day, in and beyond the realm of entertainment games.

Importantly, when aiming to support people to be playful, we face the question of whether technology is needed. Indeed, technology is not necessary for play to emerge—people can be playful with and without it. But technology is increasingly present in our lives, and it shapes our attitude towards, engagement with, and experience of the world. This bridging concept complements other contributions focused on dedicated technology-mediated play: it moves the focus towards technology that fits well with our everyday activities, seasoning them through supporting the emergence of playful engagement that can be socio-emotionally desirable. Designers have the opportunity—and, arguably, the responsibility—to design technologies that help us flourish individually and collectively. To that end, I argue that the qualities foregrounded in this bridging concept should be considered more in HCI.

This bridging concept shows different ways in which technology for play can escape the productivity hype. It unpacks design strategies to afford playful engagement for its inherent positive effects, regardless of specific productive gains. Yet, it also shows that playing “just because” does not need to be at odds with productivity [171], like “PhySeEar” [166] shows. In fact, play can be a catalyst whose benefits “spread throughout our lives, actually making us more productive and happier in everything we do” [42].

As a bridging concept, this contribution is generative, unstable, transitional, and incomplete: First, it does not offer a solid understanding of all possible socio-emotional effects of playfulness, nor does it provide a definitive set of relevant design features to play design. Second, it does not cover the full breadth of literature on play either, or all types of playful technologies. Finally, it does not directly unpack the differences between the contributions of the different authors' referenced in it—differences that could be important, or even productive in the design of Technology for Situated and Emergent Play and that should be explored in detail in future work. Despite those limitations, the value of this bridging concept is that it unpacks salient aspects within a specific design space in order to make accessible, relevant, and actionable a relevant theoretical foundation that can inspire the design of playful technology in ways that are currently underrepresented in HCI. Another limitation of this work is that it focuses on the positive socio-emotional effects of playful engagement. As pointed out by a reviewer of our CHI '20 paper, play can also have negative effects—even the exemplars described above could lead to interactions that are socio-emotionally counter-productive. For example, being able to make humorous remarks about one's neighbors through "Pinsight" could provide a platform for toxic social behavior. More research is needed to understand all the effects—positive and negative—of "Technology for Situated and Emergent Play".

It also remains future work to investigate how exactly the design articulations above can drive design processes. While some of the design exemplars in this collection clearly aimed for certain experiential qualities and/or used concrete design features as starting point (e.g. [109][201]) many others highlight experiential qualities and design features that emerged, and were found particularly useful, in interaction. This is quite common in Research through Design work, wherein design research knowledge is produced while designing and in interaction [112]. It is also common—and productive—in the design space of Technology for

Situated and Emergent Play. I conclude reinforcing the call for works that explore how designers can embrace the emergent, dynamic, and often unpredictable nature of play design practice [6]. In the methodological contribution of my thesis, introduced in Chapter 4 below, I worked to set the first steps in that direction.

## Chapter 4

# **TOWARDS AN INCREASINGLY SITUATED AND PARTICIPATORY APPROACH TO PLAY DESIGN**

In this chapter I introduce the methodological contribution of my dissertation. This research responds to the second struggle I found in my work as a play designer: too often, despite the many theories and frameworks of play design available, I struggled with designing for play that was meaningful in the scenario and for the users I was targeting. I found a lack of tools and strategies that helped me to understand what people found fun in their context, so that I could design experiences that interwove well with their ordinary practices. As discussed in 2.3 and 2.4, a review of related literature validated my lived experience: we need methods that better support play design that intertwines well with non-play activity. In response to that need, I set out to create new play design strategies and tools that are more situated, i.e. that enable a more intimate connection with the design context, and participatory, i.e. that allow relevant stakeholders to have a say in foundational aspects of the design process. My aim was to answer the question: How can we design for play that interweaves well with non-play activity, is contextually meaningful, and responds to the playful cravings of stakeholders?

To respond to that question, I began by looking at examples of my own prior work where I felt I had successfully responded to the playful desires of my target users. Using an action-reflection approach to design research [212], I reflexively engaged with my own practice to unpack what did and did not work, understand its underlying mechanisms, and distill that into knowledge that could inform future design work—mine and others'. That allowed me to find an opportunity for methodological innovation: designing for play from the bottom up, starting by looking closely at the playful things people already do in a particular context and—instead of taking theory or my own intuition as a point of departure—using those existing forms of

contextual play as building bricks of a playful design. Those existing, highly contextual manifestations of playful engagement, which I call “play potentials”, are at the cornerstone of the methodological approach I propose here: Situated Play Design (SPD). This proposal was presented at DIS’19 as a full paper; while I am the first author, I acknowledge the contribution of my advisor Katherine Isbister and my colleagues Elena Márquez Segura and Jared Duval.

Overall, this chapter sets the foundations of my methodological contribution. It is structured as follows: First, I describe the design case that served as a seed to develop SPD to illustrate the origins of my proposal (Section 4.1). Then, I introduce the design construct of “play potentials”, which stem from a reflexive analysis of that case study (4.2). Following, I talk about a set of conversations I had with other designers about their experiences with bottom-up play design (4.3), which allowed me to formalize Situated Play Design as an approach that provides a flexible structure for making designerly use of “play potentials” (4.4). Finally, I share my early thoughts on the potential of SPD to support bottom-up play design practices (4.5) and reflect on the need for new methods that make it actionable (4.6).

#### **4.1 “Playing with food”: the design case that motivated SPD**

Here I present the project that instigated the development of Situated Play Design: a design-led exploration into the design of playful gastronomic experiences [3]. The dominant idea of playful eating embraced by chefs is often narrow and does not necessarily reflect the desires expressed by other stakeholders [4]. In response, I decided to explore other forms of playful eating that were appealing to broader audiences. I conducted a series of hands-on, design-led experiments with diverse stakeholders, e.g. chefs and other restaurant staff, gastronomic critics, fine dining aficionados, and people with little or no experience with fine dining. Here I describe one of those experiments where the unfolding of events ignited the reflections that eventually brought me to formalize Situated Play Design.

The experiment involved two food enthusiasts. I began by joining them in a meal at their home, to observe their eating practices in a naturalistic setting. I used two methods: “design ethnography” [63], to study their behavior during the meal; and “tangible conversation tools” [59], to facilitate a post-meal discussion about the idea of incorporating play in gastronomy. Interestingly, throughout the session, participants often talked about play as an unnecessary and undesirable distraction in gastronomic experiences. Their actions, however, conveyed quite the opposite. Combining interviews with observation of their behavior while eating, I identified a playful interaction the food enthusiasts enjoyed: challenging and teasing each other. They did this in different ways; in particular, around the act of guessing ingredients.

That finding seemed promising from a design perspective, so I decided to design a meal around it. Until that point in my career, my design process had mostly been guided by my expertise. I sourced inspiration in a combination of theory and intuition to design experiences people found surprising. In this project, I asked myself: if these food enthusiasts already enjoy challenging, teasing, and guessing the ingredients of a dish, why would I design a meal that affords other kinds of playful experiences? Why not taking those play forms as a starting point and designing a meal around them? Intrigued by the idea of experimenting with a different design process, I designed a 4-course meal building on the observed interaction of “guessing ingredients”; each dish built on the observed interaction in a slightly different way. To add nuance to the dishes and make more exciting the core playful mechanism of guessing the food’s ingredients, I drew inspiration from play design theory, e.g. the “PLEX framework” [20]. I chose not to include participants in this part of the process, to maintain a surprise factor that I previously found key to gastronomy [4]. Here I describe two of the resulting designs, to illustrate how they built on the playful interaction I had observed before:

“Discovery” (Figure 11, left) was a side dish in the form of an evolving bread and olive oil tasting. Each diner was served six small plates: five empty and one filled with oil infused with



Figure 11. Left: The “discovery” dish, featuring the center plate, with sample ingredients and a participant tasting an infused oil. Right: the “competition” dish, featuring the nine sauces and participant being fed by another.

a mystery ingredient. Diners had to guess the ingredient that infused their oil before being served a new oil, until all six plates had been filled. Each time a diner guessed an ingredient, they could choose whether to share the answer with their fellow diner (or not). That way, the discovery process could be collaborative or competitive, depending on the diners’ choice. As “discovery” was a side dish, it stayed on the table for the entire dinner and could be combined with other elements of the meal, allowing the diners to dip in and out without the limitation of a specific time frame in which the dish should be finished.

“Competition” took the form of a dessert (Figure 11, right) comprised of nine bowls with sweet condiments and a plate of “recuit” (a fresh cheese typical of Catalunya). One of the diners was directed to close his eyes, while the other prepared a small portion of “recuit” with her choice of condiments. If the first diner could guess the combination, he would continue being fed. If he was wrong, diners exchanged roles. The dessert ended when the “recuit” ran out.

To investigate the impact of my design choices, I invited the food enthusiasts to a dinner where I served the dishes. At the end of the meal, I facilitated a reflection using “tangible conversation tools” [59]. Both my observations and the post-meal conversation indicated that the food enthusiasts enjoyed all the dishes as well as the play experiences they afforded. That was surprising: when I first engaged them, they clearly positioned themselves against the idea of playing with food. Yet, contrary to their beliefs, the combination of challenge, competition, and physical play—both with food and with each other—ended up being a source of laughter, spontaneity, and fun. According to participants, an important quality of the

experience was that the dishes allowed them to behave in ways that felt comfortable and familiar. Far from being disruptive, the playfulness integrated smoothly into their eating expectations, offering them chances to be casually playful with one another, and therefore enhancing their overall experience of the meal.

A key success factor in this experiment was that the meal I designed was strongly inspired by a playful thing I had learned my target audience already enjoyed doing, naturally, in the context I was designing for. While I used theory and my expertise as play designer to refine some of my choices, the core of my design intervention was motivated by a set of eating behaviors I had seen the food enthusiasts spontaneously enjoy. This case study helped me to uncover the opportunity of designing for play by building on play forms that are already meaningful in context—that is, designing to enhance, rather than substitute, the playful behaviors people already engage with and enjoy. As such, it planted the seed for my later reflections around the potential of situated and participatory practices in play design: it began to hint at how engaging stakeholders early in the design process, and looking closely at the ways they already behave playfully in their day-to-day, might inspire the design of playful interventions that are more contextually meaningful. In the next sections, I describe how the reflections from this case study evolved into the Situated Play Design methodology.

## **4.2 Conceptualizing “play potentials” as a design construct**

Early in my doctoral studies, I began to reflect on the methodological learnings from the “Playing with food” case. There was something about the way the design process worked that seemed very interesting to me. I tried to unpack what could be learnt about it that could foster increasingly bottom-up, contextually sensitive play design. I found an aspect of that process very relevant considering my prior struggles with designing for contextually meaningful play: throughout the experiment, my thinking and actions were situated in and focused on the

context I was designing for, as well as on the ordinary activity that took place within that context. In other words, my design process was highly situated, and by the looks of the outcomes, that brought about positive results.

Why was that process situated, and how? How could I, as a designer, use a similar approach in the future? That question was of paramount importance to me—I got into graduate school to investigate how to support bottom-up and contextually sensitive play design. Upon reflection, I understood that at the core of my process in the “Playing with food” project was the designerly use I made of a playful behavior I found in the interaction with stakeholders, in the context of their mundane activity. By surfacing and using as design material that form of emergent contextual play, I could design an intervention that participants found compelling.

The learnings that surfaced from those reflections seemed very relevant to me. They held promise of guiding designers’ attention towards contextually meaningful play forms that might have great inspirational value. Therefore, I decided to find a name for those play forms, to formulate them as a design construct that could be easily appropriated and used by other designers. I chose the term “play potentials”, to reflect the inspirational potential behind the design-oriented knowledge they encapsulate. “Play potentials” are existing manifestations of playful engagement that emerge naturally in ordinary, day-to-day scenarios, and that seem to be contextually meaningful and socio-emotionally productive. As such, designers can source them and use them to inspire playful interventions that are contextually grounded. Play potentials can help designers build on play forms that are already meaningful, and enjoyable, in a specific context, and therefore increase the chances that their interventions will adapt well to the idiosyncrasies of the context and activities targeted by the design. They extend existing play theory constructs, e.g. “modes of play” [78] by focusing on play forms observed in people's in-the-wild, spontaneous activity within a targeted design context—they represent contextual playful practices that carry valuable and situated design knowledge.

### 4.3 Contrasting my experience with other designers'

To further explore the methodological opportunities emerging around the construct of play potentials, I engaged in conversations with other designers to see if they had had similar experiences that could help me to work towards articulating a novel play design approach. Those conversations allowed me to add nuance to my early understanding of what play potentials could be, how could they be sourced, and what uses could be made of them.

An example of a colleague's experience that helped to advance my thinking is the design process behind "PhySeEar", a project led by Elena Márquez Segura focused on improving in-person physical training in an assisted living facility for the elderly. As described in a paper that was published about this project [166], its underlying design challenges were: First, inpatients hardly found the training exercises motivating. Although necessary, they were repetitive, tedious, and physically tough for most of them. Second, many inpatients could not expect to see any physical improvement from their exercises, which is often a powerful extrinsic incentive of rehabilitative therapy [133]; instead, the therapy's goal was to slow down the worsening of their condition and skills, rather than to increase capability. "PhySeEar" explored how technology could help improve the training sessions.

Early in the project, to better understand the needs of the potential users of the technology, the designers conducted interviews and on-site observations of training sessions. In those sessions, they found that socializing with the therapist was an important incentive for the elderly. Building on that finding, the designers developed a first prototype (Figure 12, left)—designed as a "provotype" [36] to provoke new and unexpected situations—that helped them to further explore the potential of stimulating socialization between inpatients and therapists. The prototype built on inpatients' desire to socialize with therapists and tried to leverage it to focus attention on the exercises. It consisted of a set of LEDs—one mounted in a stand in



Figure 12. Different iterations of PhySeEar [166]. Left: a physiotherapist roleplaying a supportive role while using the remote control to provide more strict feedback on performance through the LEDs. Right: the NAO Robot, an inpatient and a physiotherapist performing a rehabilitation exercise.

front of the patient; others attached to the body part they were training—remotely controlled by the physiotherapist through a “Wizard of Oz” system [84]. Green lights indicated correct performance; orange, minor movement flaws; and red, incorrect performance. By observing the prototype in action, designers confirmed that social interaction between patients and therapists could add value to the therapy, as it kept patients motivated and entertained.

Interestingly, designers found unexpected ways in which both patients and therapists made a playful use of the prototype: For example, a therapist spontaneously started using the lights as a strict external judge, while roleplaying a supportive and friendly role. Whenever patients were slipping, he would start vocalizing a warning, interrupting it halfway through as he changed lights (to orange or red), which he would play act empathically, surprised, or jokingly annoyed or frustrated, e.g. “Watch your... [lights change to orange] Oh, yeah... elbow. It was slightly bent”. This type of siding against the technology was very much enjoyed by patients: many started to make jokes about the strictness of the technology, teasing it, and coming up with funny names for it. That finding added nuance to the play form the designers had seen earlier in the process: it crystalized the idea of “patient-therapist socialization” into the more specific dynamic of “siding to mock the technology”. Building on that finding, designers created a new prototype inspired by that new play form. Drawing from social robot research, and in consultation with the therapist, they decided to use the NAO robot [226]. With the help

of the therapist, they pre-programmed a set of exercises for NAO to model before and during the inpatients' performance, and the most common errors they used to make, which NAO would exaggerate. The robot's eyes used the same color system to the prior prototype. When an error happened, NAO stopped its "ideal" performance, switched eye color (to orange/red), and exaggerated the movement flaw. To explore the impact of the second prototype, they used "Wizard of Oz" again, with therapists triggering NAO's responses in ways that allowed them to roleplay and take sides with patients (Figure 12, right). As anticipated, similar siding and contending dynamics between therapists, patients, and the robot emerged. Therapists also used NAO to "take the blame" for the flaws in patients' movements, to which they would refer when explaining movement issues. Patients were able to grasp these movement flaw references and made relevant corrections while joking about NAO's mistakes. They also teased the robot when it was too slow or clumsy; some even bragged about their own performance as opposed to the robot's. The robot's limitations were also picked on by therapists, who used them to set up playful challenges for the patients, e.g. moving faster than NAO. Patients found that amusing, and many intensified their engagement.

Arguably, like in the "Playing with food" case, a key success factor in "PhySeEar" was that the prototypes enabled playful and social behaviors patients already enjoyed prior to the interventions—behaviors that, as such, reflected their playful desires, e.g. socializing with therapists as confidants, as somebody to tell jokes to, and occasionally tease. Although these forms of contextual play were identified in a project that took place way before I formalized this design construct, in our reflexive conversations Elena and I agreed that they could be seen as "play potentials". Consequently, as described below, the "PhySeEar" case also played an important role in the articulation of SPD.

## 4.4 Situated Play Design: a methodological proposal

My colleagues' play design experiences allowed me to advance my thinking around the idea of "play potentials". For example, from the PhySeEar case I learned that play potentials can be found both in observation (as in "Playing with food") and by introducing playful disruptions. I also learned that play potentials can be sought iteratively, in ways that the designer's understanding of the underlying playful desires is enriched over time as ideation evolves. Building on our conversations about our similar experiences of designing for play that built on emergent expressions of contextual playfulness, and using the construct of play potentials as a point of departure, my colleagues and I decided to formalize our experience into a novel play design approach, to make these kinds of practices more actionable.

We decided to call our approach Situated Play Design (SPD), to reflect "situatedness" as one of the most distinctive qualities of our proposal. Overall, SPD supports designers to uncover existing manifestations of contextual play and use them as foundations of a playful design. It proposes three flexible steps that can be conducted iteratively: First, designers chase emerging forms of play when interacting with users in (semi-) naturalistic settings. Second, a design intervention is created to support and enhance those forms of play. Third, this design intervention is deployed in the wild, where its impact can be evaluated. Here I unpack each of those steps in detail, hoping that they will inspire others to put them in practice.

**Step 1: chasing play potentials.** Our interactions with others, with objects and with space are often—more or less explicitly—imbued with play [218]. That offers great opportunities for design: the playful experiences that emerge through the creative initiative of users are likely meaningful to them. These emerging playful acts, i.e. play potentials, can be used as foundations of a design. "Chasing play" means engaging stakeholders and their context to better understand the kinds of playful things they naturally do and enjoy, how these practices

emerge and unfold, and what they mean to them. This inquiry can uncover opportunities for realizing the inherent playful potential of a non-play activity or situation. To chase play, different known methods in design and HCI can be employed, chosen to fit the project, stakeholders, and context at hand. Strategies my colleagues and I found useful range from active interventions in direct interaction with stakeholders (e.g. “embodied sketching” [165]) to more passive non-disruptive methods (e.g. “design ethnography” [63]), and strategies with diverse degrees of designer involvement in between (e.g. “cultural probes” [105] or “tangible interviewing tools” [59]). At this stage of SPD, theory should not be used to drive ideation but rather as a lens to make sense of the emergent playfulness designers observe in the wild.

**Step 2: designing to realize the observed play potentials.** Once play potentials are identified, designers can conceptualize and develop prototypes that help to realize them. That intervention should incorporate, or take as inspiration, the observed playful interactions, play challenges, or rules of play that stakeholders found meaningful in the targeted context of use. Here, the designer’s expertise and repertoire of tools—including play, game, and general design theory—becomes relevant, to craft a compelling play experience that incorporates and enhances the play potentials. Design choices should not be primarily theory-motivated, though—expertise and theory are used to add to, take in, or augment the play potentials observed in the first stage of SPD. At this stage, it is also important to keep design interventions open-ended and ambiguous, to enable user appropriation [188][215].

**Step 3: deploying, evaluating, and iterating.** The third stage of SPD is performed when design solutions start to materialize. Drawing on the notion that a design project does not end with an artifact being produced [245], SPD encourages designers to deploy and iterate their work in naturalistic settings, to assess their impact in context and envision future directions. In this step, SPD aligns more with traditional game and play design approaches: it involves continuous iteration and exposure with users in the wild as a way of progressively bringing a

playful design to its final form. Here, knowledge in playtesting or user studies is useful, as well as play and game design theory (e.g. [20][25][211]): they provide lenses to understand the design's impact. This phase of SPD may lead to different outcomes besides an improved version of a design, e.g. the formation of “intermediate-level knowledge” [132].

#### **4.5 The potential of SPD to support bottom-up play design**

While some game and play design works may already be using similar strategies to shape their design processes, e.g. works in “playification” [166], a method articulating how this can be done had not yet been proposed by the time my colleagues and I published our DIS'19 paper [6]. We saw a lack of methodological discourse around the idea of using play potentials to design for situated and emergent play. In response, we decided to propose a novel approach to address it, to visualize the need for methodology contributions in this space and offer an open frame where participatory play design practices can be shared, combined, and critically reflected upon. By formalizing the Situated Play Design approach, my colleagues and I articulated a series of user involvement practices that we found useful in our own work, hoping to make them actionable for others. The main contribution of SPD is that it empowers designers to identify and understand emergent playful dynamics that already exist in context—and are thus likely to be meaningful to users—and to respond to them by design.

Importantly, SPD does not exclude, but rather builds on, complements, and extends many design strategies often employed in User-Centered Design (UCD), Participatory Design or game and play design. For example, it builds on UCD by including users in the design process, but considers them active contributors rather than inspirations or testers. SPD positions stakeholders as creative partners [85], while in UCD their role is to indirectly influence the designer's work. Instead of limiting user input to playtest sessions or refinement of existing prototypes, SPD leverages stakeholders' tacit knowledge of their own realities

from the moment a design process starts. It is thus inspired by Participatory Design [88][184], a longstanding tradition of leveraging multi-stakeholder engagement as the driver of design processes [126]. Yet, instead of focusing on accessible, usable, or democratic solutions, Situated Play Design is primarily concerned with play and playfulness. Participatory Design offers strategies to better understand how users act in their everyday, e.g. Druin's insights on children's participation in technology design [85]. Following recent calls to rethink Participatory Design, Situated Play Design adds a nuance to traditional PD approaches by proposing co-creative strategies to surface existing manifestations of contextual play—i.e. play potentials. The focus shifts from what users do, to how they engage playfully in their everyday. Further, while in SPD users take a prominent role, solutions do not always reflect a fully transparent and democratic process, which is often the case in Participatory Design.

SPD shares with play and game design a focus on playfulness as a design outcome. Yet, instead of focusing on stakeholders' play preferences per se, SPD extends those approaches by offering actionable tools to surface existing manifestations of contextual play that people already enjoy in their ordinary practices. This is a novel approach to user involvement in play design: studying and making design use of “play potentials”—existing playful dynamics that are already meaningful in context—as the cornerstone of a playful intervention. SPD helps to realize, rather than disrupt, the inherent playful potential of existing non-play activities, enriching them by enhancing ways of interacting that are already common in those activities. Thus, it facilitates the design of interventions that afford the emergence of contextually-meaningful playfulness—i.e. the attitude that allows us to experience play within activities that are not play [218]—as a way of reframing mundane, non-play activities into playful ones.

Importantly, SPD is an open methodological frame aimed at supporting emergent playful design practices. Inspired by previous calls for new methods in design research [251], it formalizes play design to afford actionable strategies to design for non-entertainment play,

but it does so in an open and flexible way. Rather than enforcing a unique set of practices, SPD gives pointers to a diverse set of malleable tools that can help designers design for situated and emergent play. SPD aligns with a generative understanding of Research through Design [112]—it structures design “just enough”, to make it approachable. It does not attempt to simplify design or eliminate uncertainty. Instead, it empowers designers to navigate—and leverage—that uncertainty. SPD is an evolving framework that encourages designers to share best practices and thus diversify the set of tools available to the community.

#### **4.6 Towards making SPD actionable**

In the paper where my colleagues and I formalized Situated Play Design [6], we shared tools we found useful to put it in practice. However, we also acknowledged that there might, should, and will be many more. As with any emergent methodological space, there is a need for further research on methods that make it actionable in a diversity of scenarios and for a diversity of purposes. In a subsequent, shorter paper [9] (presented at the Halfway to the Future ‘19 symposium), we outlined five unaddressed challenges we encountered in our work. Here I present them as opportunities for developing new methods under the umbrella of SPD, some of which I addressed during my doctoral research (see Chapter 7):

**Challenge #1: How do we talk about play?** Play is an abstract, elusive concept. It is often difficult to talk about it—not only do we lack a robust language for the aesthetic experience of play [217], but we also lack mechanisms to facilitate multi-stakeholder conversations about it. Designers have long been using “tangible tools” to facilitate conversations [59]. Yet, these tools often address issues other than play (e.g. business innovation [50] or stakeholder empowerment [28]) and focus more on people’s pragmatic needs than on their playful desires. There is a need for tangible conversation tools that focus specifically on play by bridging current tools with play-focused theories, frameworks, and taxonomies.

**Challenge #2: How can we chase play potentials in the wild?** Play potentials are often spontaneous and hard to predict. Their ephemeral nature makes it challenging to chase them and realize them by design. We need mechanisms that help us to respond effectively to the emergence of playful engagement in naturalistic settings. Inspired by existing methods for first-person research [161] and embodied ideation [244], we can create tools that empower us to capture the play potentials emerging around us. I also suggest it might be interesting to crowd-source that process. Given the ubiquitous nature of social media, I wonder: could we use it to capture personal accounts of playful activity, and share those play potentials so they can be discussed through, and cross-referenced with, other people's lived experiences?

**Challenge #3: How can we find playful inspiration in culture and traditions?** Culture and traditions are rich areas for chasing play potentials that have not yet received much attention. That is a missed opportunity, as play shapes and is shaped by culture, everyday practices are imbued with play [52], and societies can be understood by looking at how their members play [134]. I see a lack of actionable tools that enable chasing and making designerly use of play potentials embedded in traditions and other kinds of cultural rituals. I propose to explore how to leverage such latent knowledge: how might we identify interesting manifestations of play that are culturally embedded, and unpack them into inspirational design material?

**Challenge #4: How can we design for playful engagement within future activities and scenarios?** The role of interaction design is not only to design for today, but also to envision the technologies of the future. Speculative methods help designers and other stakeholders to co-imagine technology futures and reflect on the human-technology interplay in those future scenarios. They typically result in design concepts that critique aspects of mainstream tech design. Although there are exceptions (e.g. [90][175]), speculative methods are often more critical and rhetorical than experiential—they are better suited to raise controversial issues than to explore the potential of technology to support novel and rich playful experiences. I see

a need for adapting existing speculative methods to better respond to the idiosyncratic needs of play design, i.e. to focus on projecting increasingly playful futures. That move can build on existing design methods that put the focus on embodiment, improvisation, and materiality, e.g. “embodied sketching” [165], “object theatre” [205], or “LARPing” [67][167][168].

**Challenge #5: How can we realize the world’s play potentials here and now?** One of the limitations of contemporary play design research is that its outcomes are mostly disseminated within academia. That is at odds with the notion that designers have the opportunity and the responsibility to address important social issues through play [113]. Recent calls to rethink PD [34] remind us about the importance of doing research that has a direct impact on people’s lives, here and now, and not only within academia. If we want to realize the world’s playful potential, promoting playful transformations in the communities involved in our research should be as important as publishing academic work. Existing HCI dissemination forms hardly serve that purpose; even “annotated portfolios” [159], highly visual and inspirational, target researchers and designers as audience. Inspired by experimental forms of knowledge transfer in art and design, e.g. “cultural commentaries” [110] or “participatory exhibitions” [221], I see an opportunity for experimenting with new forms of dissemination that make accessible to the general public the outcomes of SDP, e.g. through public annotated exhibitions of multi-stakeholder play design processes and the resulting designed outcomes.

While this list does not cover all the gaps within SPD, I hope it illustrates the need to enhance the palette of strategies available in this novel methodological space. The list calls for new tools that support multi-stakeholder involvement in the idiosyncratic space of play design and encourages other designers to share strategies they found useful in their work. As described in Chapters 5 and 6, throughout my Ph.D. I experimented with new ways of responding to some of the above challenges. In Chapter 7 I present the outcomes of that process, in the form of an early toolkit of strategies I hope will make it actionable for others to use SPD.

## Chapter 5

### **CASE STUDY #1:**

# **DESIGNING PLAYFUL MEALTIME TECHNOLOGY**

As part of my doctoral research, I worked on two design projects where I used Situated Play Design to co-design playful tech that adds socio-emotional value to people's day-to-day. The two case studies played a dual role in my research: first, they enabled me to produce domain specific knowledge in the design spaces they targeted (mealtime technology and smart cities, respectively); second, they allowed me to experiment with, challenge, and further develop the SPD approach. In this chapter, I present the first case study, where I investigated how to design technology to enrich in-person mealtime experiences playfully and socially.

Aside from my advisor, Katherine Isbister, several people were involved in this project. First, it was partially funded by Google's Digital Wellbeing group, whose members Lauren Wilcox and Reeta Banerjee contributed as wellbeing technology experts. The project also involved four research assistants: Alexandra Pometko and Muskan Gupta helped with play-chasing and ideation, while Benjamin Sihota and Jatin Alla were part of prototype development and the user study. Other researchers were part of a specific play-chasing activity I led as part of a CHI Play '19 workshop (see 5.3.2): Jared Duval, Elena Márquez Segura, Laia Turmo Vidal, Yoram Chisik, Marina Juanet Casulleras, Laia Badal León, Oscar Garcia Pañella, and Danielle Wilde. The work done with the "Feeding Food Futures" group (<https://foodfutures.group>)—in particular, with Markéta Dolejšová, Danielle Wilde, and Hilary Davis, my co-founders—also influenced my research. Although I spearheaded this project and the resulting publications, I acknowledge the importance of my colleagues' contribution.

The chapter is structured as follows: I begin by characterizing the design and research space targeted by the project, Human-Food Interaction (Section 5.1). I look at existing literature to

highlight trends, challenges, and opportunities emerging in this space, and I build on that landscape to position my agenda of exploring increasingly playful and socio-emotionally sensitive avenues for food-tech design. Following, I describe the methodology I used in the project (5.2). Then, I present two initiatives I took to chase play potentials during people's mealtime, i.e. to identify contextually-grounded opportunities for playfully re-signifying mealtime (5.3). Building on those play potentials, I present a catalog of mealtime tech ideas I developed to speculate on how the kinds of playful behaviors I observed in the play-chasing phase could be translated into novel design concepts (5.4). Following, I describe a multi-stakeholder co-design initiative I took to experiment with, challenge, and further advance the ideas in the catalog (5.5). I then present a fully functioning prototype I designed, building on the outcomes of that co-design process, as well as a study of its impact in use (5.6). Finally, I reflect on the outcomes of this design research project (5.7). Overall, this chapter: (1) highlights desirable design qualities of playful mealtime tech, (2) provides tangible examples of how the Situated Play Design methodology can be used, and (3) describes a set of processes that I later formalized into an emergent toolkit of SPD methods (see Chapter 7).

## **5.1 Human-Food Interaction: from techno-solutionism to playful approaches**

Human-Food Interaction (HFI) is an emergent, dynamic, and heterogeneous research space that studies the growing presence of technology in people's food lives to propose desirable design directions. In a systematic review I conducted early in my Ph.D. I found that, though there are exceptions, HFI research often seeks to scale up, automate, or make otherwise more efficient our food practices. Less attention is put to exploring how to make those practices more ecologically sound, culturally stimulating, socially connected, or emotionally rich [5]. That trajectory can have negative implications: privileging utilitarian views of the human-food-technology interplay compromises the socio-ecological sustainability of food

systems, local and global [81]. We need “food experiences that are socially engaging, culturally aware, and playful by taking inspiration from diverse local food knowledges and traditions [...] rather than deliver quick-fix solutions aimed at consumer convenience” [82].

In this design project, I turned to play and playfulness to respond to that call. Eating is known to be far more than a biological need [83]—designing tech that neglects the multifaceted nature of food practices can compromise their ability to holistically contribute to our wellbeing. Building on my conceptual contribution (see Chapter 3), which highlights the capacity of play to afford pleasure, social and emotional connection, agency, and positive feelings [10], I set out to explore how playful technology could help to fulfill those needs. I explored how play can help to rethink food-tech innovation beyond productivity and embrace (and cherish) the social, cultural, and emotional function of mealtime.

The use of play-inspired strategies in Human-Food Interaction is not new. Works in this space are often referred to as Playful HFI. In a review of Playful HFI literature, my colleagues and I found that, just like the broader field of HFI, Playful HFI often gravitates towards making our play-food time productive by helping to optimize it [7], e.g. promoting healthier habits [195], supporting dietary change [192], or teaching food safety regulations [163]. While there is value in that approach, my work centered on an equally relevant agenda: exploring how technology could enable socio-emotionally rich food experiences regardless of a productive gain. As my co-authors and I proposed in [7], echoing [106], “ludic design can support values such as curiosity, play, exploration and reflection, which are not only important, but are essential to wellbeing”. I argue those values are highly relevant in the context of mealtime.

The idea of designing technology that enhances the experiential texture of mealtime is not new. “Celebratory technology” [120] was introduced over a decade ago as a provocation to inspire the design of technology that affords joy and wonder while eating. Some works have

explored that idea in practice, e.g. Mueller & Khot et al.'s technology designs that enable novel ways of interacting with and around food. They have produced several exemplars (see [183] for a compilation), such as: "Arm-a-dine" [176], a robotic arm that feeds diners in bizarre ways to stimulate social interaction; or "iScream" [247], a technological ice cream cone that plays hilarious sounds when the ice cream is licked. Behind these designs is the idea of using tech to enable surprising ways of playful eating—an idea that inspires my work. Yet, the play forms foregrounded by those exemplars are not explicitly contextually grounded: they explore interesting ways of designing for food-play, without necessarily involving stakeholders in the decision-making process. There is an opportunity to expand upon this work by engaging diverse stakeholders in discussions about why playing with food is fun (and how).

In my master's, I picked up on that opportunity to explore how to playfully enrich mealtime. I investigated how to reconfigure the experience of eating in gastronomic restaurants in ways that are disruptive yet contextually sound, e.g. the "Mad Hatter's dinner party" [13]. Unlike Mueller & Khot et al., I took a bottom-up approach to shaping food futures [248]; I involved both expert (chefs) and non-expert (average diners) stakeholders to co-design experiences that resonated with diverse playful desires and sensitivities. But that work focused specifically on fine dining, so the play forms it explored may not apply in more mundane scenarios.

However inspiring, existing Playful HFI works are often: "productivity focused", i.e. play responds to utilitarian agendas; "de-contextualized", i.e. the play forms explored may or may not be grounded in stakeholders' desires; or "out-of-the-ordinary", i.e. they target exceptional food experiences that are out of the scope of people's day-to-day. If we want to design tech that playfully enriches mealtime in ways that are contextually sound, we need to transcend those limitations. We must better understand the inherent playful potential of mealtime and investigate how to realize it by design. In this project, my aim was to advance that agenda.

## **5.2 Method: using Situated Play Design to explore increasingly playful and socio-emotionally sensitive mealtime futures**

This project used the Situated Play Design methodology (see Chapter 4): I learned about and empathized with people’s existing playful eating practices; ideated tech that responded to them; co-experienced and -iterated those design ideas with stakeholders; and developed and studied a fully functioning prototype. I began with contextual research (i.e. play-chasing) with the aim of identifying “play potentials” of mealtime: playful things that people already do while eating and contribute to the quality of social mealtime experiences (Section 5.3). To do that, I conducted two explorations: First, I circulated an online survey and a cultural probe to explore people’s playful and social mealtime habits, with and without technology (5.3.1); Second, I ran a workshop where people from diverse countries shared, played with, and analyzed food traditions from their culture—to identify forms of playful eating that were ingrained in them (5.3.2). That uncovered play potentials of mealtime that inspired my subsequent design work.

Building on the play-chasing results, I produced a “Speculative Catalog of Playful Mealtime Tech”: a collection of early, half-baked design ideas that embodied my main learnings about people’s playful mealtime practices (5.4). I then experimented with lo-fi prototypes of these design ideas at a series of remote co-design sessions (5.5): inspired by a combination of co-design methods (e.g. “wizard-of-oz” [68] or “design fiction” [235]), I engaged diverse people to co-experience and rethink my ideas. That helped bring my speculations back to the domain of people’s ordinary routines. I sensed which ideas did and did not resonate with people’s playful cravings; better understood how they might work in practice; explored how they might be different if participants could re-invent them; and, more generally, gauged people’s thoughts on the value of using playful tech at mealtime. From my co-design engagements I distilled 5 guidelines for designing playful mealtime technology. Building on those insights, I designed and evaluated a playful technology that built on one of the early ideas in the catalog

(5.6). I deployed and studied a prototype of that idea, in-the-wild, and extracted some additional insights that added nuance to the learnings from earlier phases of the project.

### **5.3 Chasing play: exploring the playful potential of mealtime**

The first phase of the project focused on chasing play potentials, i.e. identifying forms of playful engagement people already enjoyed while eating. Here I report the findings of my two play-chasing explorations: a survey and follow-up cultural probe focused on day-to-day eating practices; and a workshop exploring playful food traditions from different parts of the World.

#### **5.3.1. Exploring people’s playful eating practices through a survey & cultural probes**

Play-chasing began with an online survey about people’s experiences with tech use at mealtime. The survey<sup>1</sup> included 29 questions (both quantitative and qualitative), and covered:

- Demographics, e.g. “How would you describe your knowledge of technology related to internet, computers, and smartphones?”, formatted as a 5-point Likert scale between “far less than average” and “far above average”.
- Mealtime habits, e.g. “On a scale of 1-5, how important is it for you to feel socially connected during a meal?”
- Technology use during mealtime, e.g. “Can you think of a meal you experienced where technology improved social interaction around food? Please explain.”

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<sup>1</sup> Survey: <https://forms.gle/XkTomTDhzewN4cLs9>; dataset of unfiltered responses: <https://bit.ly/3AoBC10>

To recruit participants, my research assistants and I shared the survey via social media and mailing lists and distributed 200 flyers in local cafes and restaurants. 35 people answered: 54.3% were 25-34 years old; others were 35-49 (22.9%), 18-24 (8.6%), and 50-64 (8.6%). One participant was older than 65; one chose not to disclose. 18 countries were represented: respondents were originally from Spain (11), the US (9), the UK (2), Portugal (2), and Israel, Colombia, Ukraine, Hungary, Italy, Lithuania, Mexico, Germany, and Russia (1); they were currently based in the US (14), Spain (9), Portugal (3), the UK (2), Denmark (2), and Sweden, Italy, New Zealand, Russia, and Canada (1). Different household configurations were accounted for: 28.6% lived with their partner; a same amount with friends; 22.9% with their family (including children); 17.1% alone; and one with a host family. We analyzed the data using “inductive thematic analysis” [40] and identified several relevant lived experiences related to mealtime, from which we produced a report highlighting a set of design recommendations, accessible at: <https://bit.ly/3zw5pDE>.

Following, we conducted a “cultural probe” [105] intervention to further investigate people’s food, play, and tech use practices and identify forms of playful and social eating they enjoyed. We distributed a digital booklet<sup>2</sup> with 7 playful activities (Figure 13), one for each day of the week; the timeline could be adapted if needed. Activities involved reflecting on people’s eating and tech use habits, e.g. one prompted them to recall past food experiences and enact them in a video; another invited them to put phones aside for a day, decide punishments for those who did not, and reflect on how a day without phones went. We invited survey respondents to participate and shared a call for participation on social media (Figure 14).

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<sup>2</sup> Link to the full cultural probes booklet: <https://bit.ly/3EFwb07>



Figure 13. Some pages of the cultural probe booklet we sent out to 12 households, including: the day 2 activity, which invited participants to performatively overplay their phone use habits and reflect on them (left); and the day 6 activity, which prompted participants to design a food-based game (right).



Figure 14. Sequence of Instagram story posts we used to recruit participants for our cultural probe intervention.

12 households participated (37 total participants). 45.9% were 25-34 years old; others were 35-49 (21.6%), 50-64 (21.6%), 18-24 (5.4%), and 3-8 and +65 (2.7%). They were originally from Spain (15), the UK (7), the US (5), New Zealand (2), France (3), Ukraine (2), Germany (1), and Vietnam (1); they currently lived in Spain (15), the US (8), the UK (6), France (4), and New Zealand (4). To analyze the data, we combined “inductive thematic analysis” [40], for textual data (e.g. a written reflection), and “visual content analysis”, [27] for visual data (e.g. a photo of a food game). After a first round of analysis, we held a meeting where we negotiated a final list of codes to ensure inter-coder reliability in our second round of analysis. The combination of the survey and cultural probes surfaced a set of playful food practices people enjoyed at mealtime. Here I present a selection<sup>3</sup> of these play potentials, focusing on those that might inspire the design of tech that responds to people’s desire for shared experiences around food. To refer to the data, I use the conventions S (e.g. S1 means survey participant 1) and CP (e.g. CP1 means cultural probe household 1).

**Play potential #1: Mimicking each other’s anti-social behavior to make everyone laugh.**

CP1 and CP11 enjoyed teasing, imitating, and making fun of one another while eating. They playfully mocked each other’s excuses for using their phone at the table, turning a potentially negative behavior into an opportunity for shared laughter. Designers could think about how to encourage people to playfully mimic each other’s anti-social behaviors at mealtime, in ways that are fun yet at the same time respectful.

**Play potential #2: Competition with custom-made rules and real-life consequences.**

CP1 turned the phone detox activity into a competitive game and teased each other to lose. That helped them to be more present and pay more attention to their actions. A key part of

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<sup>3</sup> The complete list of play potentials we identified in our contextual research can be accessed at: <https://bit.ly/3tVXGh0>



Figure 15. Some of the cultural probe responses we received, including: CP1's custom competitive rules to spice up their meals (left) and edible board game they designed to make exploring new ingredients and flavors more fun (center); and CP7's photo of a past mealtime experience where they enjoyed disrupting social norms.

that experience was creating punishments and house rules, e.g. the loser would do the chores the next day (see Figure 15, left). Designers may want to explore ways of allowing people to improvise lightweight competitive challenges at mealtime, in ways that they can regulate their underlying structure (i.e. the rules and outcomes) to their own will.

**Play potential #3: Exploring and learning new things together while eating.** CP2 shared an interesting family ritual: his “originally British family gave kids placemats with maps on them [...]. Kids would take turns thinking of a city in the map and others would guess what it was”. S32 talked about the potential of tech to turn meals into fun educational experiences, and S17 suggested that it would be fun to learn things by “eating/sharing food based on a game’s outcomes”. Designers may want to consider affording open-ended experiences where people can explore and challenge one another to learn new things while eating.

**Play potential #4: Silly miscommunication.** CP2 experienced a hilarious situation where two of the household members who did not speak a common language tried to communicate during mealtime by using Google Home as a translator. The translation algorithm made silly errors, which led to playful reactions, laughter, and a spontaneous sense of connection between participants. Designers could explore how, by constraining communication channels, they might be able to provoke funny types of misunderstandings during a meal.

**Play potential #5: Playfully disrupting social roles and power structures.** CP7 shared a delightful mealtime experience where people dressed up and behaved in ways that were in stark contrast with their social status, e.g. a college dean wore a holiday costume, which brought about playful estrangement and changed the social dynamics (Figure 15, right). Similarly, CP9 noted how much they enjoyed family traditions where each person had their own role in preparing food. In both stories, people reframed their social role performatively—sometimes, in silly ways. Designers could explore how to create opportunities for disrupting power structures to help people to loosen up and be spontaneous while eating.

**Play potential #6: Letting technology be the judge.** CP11 enjoyed using phones to settle arguments, to pull up information to clarify who was right and who was wrong. That brought about thrill and, depending on the outcome, laughter. S12 proposed a similar mechanism for a different purpose: “an app that shames you for using non-communal tech too much in social situations”—helping co-located eaters to call out each other’s behavior while minimizing the risk of offending someone by putting the blame on a somewhat funky device might help to make the situation less serious. Designers could be inspired by these examples to explore how technology could embody the role of a judge that playfully mediates between diners.

**Play potential #7: Taking over the technology to create interesting social situations.** Participants proposed using tech to create interesting social situations. S12 shared their experience of “pranking’ others by changing smart speaker settings”. On a less sneaky note, S14 reported using tech to create “the right mood for people [to] be more cheerful and open up to a social experience”. Designers may want to enable people to appropriate technology to craft custom provocations that enhance their and their peers’ experience of a meal.

### 5.3.2. Enriching the list of play potentials through an exploration of food culture

To complement the play potentials found through the survey and cultural probes, and to explore novel ways of chasing play potentials, I decided to experiment with culture as a source of playful inspiration—one of the underexplored methodological opportunities I highlighted in 4.6. Interestingly, play is an important factor in many traditions and rituals [233]; as I will show in the following pages, food traditions are a clear example of that. In those traditions, play is deeply and seamlessly integrated into culture, to the extent they embody play potentials relevant to people from that culture. Hoping to extract playful inspiration for my work, I co-organized a workshop [8] where 18 academics and practitioners from different countries shared, played with, and made design use of a collection of food traditions. Participants came from or had lived in Spain, the US, Canada, Australia, Denmark, France, Germany, Israel, Colombia, Philippines, China, Turkey, Portugal, Belgium, the Netherlands, and the UK. They practiced in areas like interaction design, design research, gamification, computer science, business development, and HCI.

Prior to the workshop, participants submitted photos and short descriptions of food traditions from their culture, community, or family. At the workshop, we experienced, discussed, and analyzed these traditions using food and food-related materials, as well as a diverse set of design research strategies (Figure 16). These strategies included both analytical tools, to examine traditions through theoretical frameworks of play (e.g. [20][52][134][154][207][217][218][229]) and HFI (e.g. [5][7]), and embodied design research methods, e.g. modifying the



Figure 16. Workshop participants, using our play-chasing toolkit to playfully experience and make sense of the collection of food traditions we collectively produced.

traditions through “embodied sketching” [165]. The tools allowed us to explore what made the traditions fun and how they facilitated interesting social experiences. We worked in small groups, then shared insights and collectively clustered our findings into play potentials. After the workshop, I thematically analyzed the workshop recordings and used that to challenge and solidify the outcomes. Here I report these in the form of an annotated portfolio of play potentials (published as a pictorial at DIS’20 [12]) highlighting interesting design qualities that afford playful and social engagement in food practices. I present the resulting play potentials divided into 4 categories that emerged from the analysis.

**Playing with the materiality of food.** There are different ways in which traditions leverage the material richness of food to support playful activity. Some traditions are fun because they challenge and allow us to (#1) “get messy”. For example, in “La Calçotada” (a tradition from Catalonia) people gather to grill and eat a type of onion called “calçot”. Eating them is difficult: their size and elongated shape make them hard to put in one’s mouth. Quite often, the sauce they are dipped with ends up dripping and falling onto one’s face or clothes (Figure 17A)—making the whole party laugh. Playing with food can also give us chances to be subversive and (#2) “mess with others”, which allows us to laugh together and strengthen bonds. “La Calçotada” exemplifies this play potential too: as people’s hands get dirty from removing the burned peels of “calçots”, they can sneakily paint each other’s faces (Figure 17D). Fun can also derive from the capacity of food and drinks to (#3) “alter our physiology”. For example, “Touhu” is a game with origins in traditional Chinese archery rituals (Figure 17C) that requires players to throw arrows from a set distance into a large vase. If the arrow misses the vase, the player must drink some wine. Drinking is not only the reward but a key element of the experience: the more drinks, the less dexterity, and therefore the more laughter and fun. Another play potential enabled by the capacity of food to affect our senses is (#4) “messing with our sense of taste”. For example, “Pimientos del Padrón” (Spain) is a snack made of



Figure 17. Food traditions that play with the materiality of food to deliver fun experiences.

small peppers with a special trait: only some are spicy (Figure 17E). That creates an opportunity for social play: a “Russian roulette” situation where the thrill of not knowing whether the selected pepper will be spicy is combined with the excitement of seeing others experience the bad luck of eating a spicy one. Finally, other traditions play with the materiality of food by (#5) “using food as a play prop”, as a silly-looking object that can be used to dress up and decorate, e.g. a highlight of “The Kale Tour” (Germany), which celebrates the kale harvesting season, is to see the Kale King wearing a crown made of kale (Figure 17, C).

**Playing with inedibles: utensils, vessels, and props.** Inedible food-related items are often integral to how we play and eat. Several traditions use inedibles to afford playful food experiences. For example, (#6) “sharing utensils and vessels” as we eat, drink, or cook can lead to emergent playful interactions between people. In “Kamayan” (Philippines) people

gather around a table and share a meal with their hands (Figure 18C). Using hands to eat from a shared vessel inevitably leads to social interaction, e.g. it is not uncommon for family and friends to feed each other. Utensils and vessels can also be used to (#7) “challenge or estrange” while eating or drinking—especially fun when one is in the spotlight. For example, “El Porró” (Catalonia) is a tradition of drinking wine out of a special vessel that streams the wine out of a small nozzle (Figure 18B), a challenge that results in many stained shirts. This tradition is brimming with opportunities for playful engagement, including: racing to be the first to finish the wine, singing or talking while drinking, or spilling the least wine as one becomes inebriated. Another example of playing with inedibles is hiding and (#8) “finding surprises in food”, which creates expectation about when the hidden item will be found and by whom. For example, “The King’s Cake”, otherwise known as “Roscón de Reyes” (Spain) or “Galette des Rois” (France), is a tradition that is enjoyed at epiphany, a celebration that honors the biblical figures of the Three Wise Men. In this tradition, a king figurine (and often a bean) is hidden inside a cake (Figure 18D). Whoever finds the king figure in their slice of cake will be treated like a Royal Highness all day. Depending on the regional variation, the king is immune from washing dishes, will have food and drinks brought to them, and/or will get to wear a paper crown. The recipient of the hidden bean becomes the butt of all jokes for the rest of the day and often must pay for the cake. The addition of these hidden objects in a cake opens up many opportunities for social play, including: competing for pieces, placing bets on who will find them, abusing the king’s power, or teasing the bean recipient. Inedible materials can also allow us to (#9) “play with inedible food remains”, both before and after eating. “Las Tabas” (Spain), is a throwing game using the 4 sides of lamb’s astragalus bones (Figure 18A). The four possible rolls—“hoyo”, “panza”, “pico”, and “fondo”—are used in luck and ability games such as trying to roll sets of the same orientation or tossing the bones in the air and manipulating others on the table before catching the tossed bones as they fall.



Figure 18. Food traditions that use inedibles such as utensils, props, and food remains to play.

**Playing with the physical space.** Food play can also derive from the physical configuration of the space in which food activities take place. That includes not only the physical properties of the space, but also people's movements within it, or the placement of the food materials and diverse food-related objects. Some traditions elicit fun by inviting people to (#10) "sit and act strangely", bringing them together in an uncommon space and prompting them to act in unconventional ways. For example, in "La Castanyada" (Catalonia), people sit around a fire pit or fireplace to bake and eat chestnuts (Figure 19B). They sit on the floor (as opposed to a chair, as is common in Catalonia) around fire (as opposed to a table); they eat chestnuts (as opposed to a full meal), baking them directly on the fire (as opposed to cooking with modern kitchen equipment); sometimes people even dress in traditional clothes, though this is less

common. These unusual actions lead to playful estrangement and invite people to commit to sharing a unique experience for the night. In other traditions, fun comes from (#11) “setting up a visually exciting table”: placing food and utensils in decorative ways to inspire awe, plentifulness, and wonder. For example, in “Hot-pot” (China), a boiling pot of broth is laid out in the center of a table with an abundant selection of uncooked meat and vegetables (Figure 19A). The combination of foods and food-related objects creates a table configuration that is colorful and exciting and encourages diners to be playful: it invites them to explore and experiment with their food choices to personalize their dining experience. Further, the shared pot of broth brings diners physically together, inviting them to cook together and share food. We also see traditions where the table is not deliberately set up to be playful from the onset, but people playfully appropriate the meal space. This is the case of emergent games and contests where people (#12) “create a play space with meal-related items”, re-signifying the table, the floor, or another food-related surface. For example, “Las Chapas” (Spain) is a game people play with bottle caps (Figure 19C). It can take different forms, e.g. inspired by football, players create an improvised football pitch with the objects they have at hand and



Figure 19. Food traditions that the physical space as a platform for playful interaction.

use bottle caps as the ball to score goals with their fingers; or inspired by car races, players create a racing track and compete to knock their bottle cap to the finish line. Other traditions expand the boundaries of the meal space by extending it to the outdoors and inviting people to (#13) “go out on an adventure and earn their well-deserved feast”. For example, in “Kale Tour”, the meal where the new “Kale King” is elected is the culmination of a hiking tour through the local forest organized by the former king (Figure 19E). The tour involves several stops where people typically play ball games, eat, and drink; they carry a cart with a food and alcoholic beverages, adding a performative dimension to the hike. “Trick or treating” (North America) requires people to go out and earn their food too: they knock on neighbors’ doors to receive candy. Play comes both in the stops and in the entire festive route (Figure 19D).

**Playing with rhythm and social norms.** In several traditions, fun derives from changes in the rhythm and social norms that regulate the food activity. On occasion, that takes the form of short, fast-paced activities where people (#14) “experience thrill and humor”, which often leads to bloopers and laughter. For example, in “Las Uvas” (Spain), which celebrates the new year, people eat 12 grapes in the last 12 seconds of the old year, one every second (Figure 20D). This is a challenging task—people often struggle with it, especially as they approach the last few grapes. Eating the 12 grapes successfully is supposed to bring luck for the new year, which adds mysticism to the task and makes it relevant. That often leads to emergent social playfulness in the form of teasing, as people try to disrupt each other’s grape-eating, e.g. by trying to make each other laugh. Thrill, fun, and laughter can also come from (#15) “receiving ambiguous rewards” either as a prize or a punishment. For example, in the drinking game “El Duro” (Spain), players drink if a tossed coin falls into their glass (Figure 20E)—a reward that is often seen as a playful punishment that players might look forward to, but also might try to avoid to not become more inebriated than others. In other traditions, fun, laughter and, more generally, social bonding emerge as people (#16) “do things together”,

cooking, eating, moving, or saying things in coordination. For example, in “Cookie-making” traditions (various cultures), sharing a table, the ingredients, and the cookie-making tools brings people together and can lead to emergent social play (Figure 20A). Other traditions follow a similar principle: In the drinking games played with “El Porró”, people synchronize bodily movements, drinking while assuming a strange body posture motivated by the shape the drinking vessel (Figure 20C). In “Pimientos del Padrón”, the thrill of not knowing whether a pepper will be spicy is highlighted with a rhyme that sets the mood and expectations for the social situation (Figure 20B): “Pimientos del Padrón, unos pican y otros no”, which translates roughly to “Padrón peppers, some are hot, others are not”. Another recurrent source of fun playful food traditions is (#17) “celebrating a special occasion” that is unique, themed, and somewhat magical. For example, in “Las Uvas” people celebrate the arrival of the new year by wearing silly costumes and props, cheering with cups full of champagne, or setting off fireworks (Figure 20D). In “La Calçotada”, people wear large bibs that, besides helping to avoid stains on their clothing, add to the aesthetics of the meal (Figure 20K). “The King’s Cake” highlights the arrival of the Three Wise Men with a king figurine and a king crown, and gives a lucky diner the chance to become a one-day king (Figure 20J). “Halloween” is celebratory and performative too: people decorate their houses, dress up in costumes, and carve pumpkins with spooky faces (Figure 20H). In these kinds of traditions, fun can also derive from (#18) “taking roles”, sometimes with the possibility of appropriating, adapting, or even transgressing them. For example, “Cookie-making” allows for different roles and shares of responsibility, e.g. adults can push the process forward by preparing the dough, while telling children what to do and what not. These roles can afford playful transgressions. For example, in a participants’ family cookie-making ritual, children found ways to sneak around adults to eat cookie dough as it was being prepared, something the adults had told them not to do. In another participant’s family tradition, teenagers often decorated the cookies in ways that they knew would provoke, and perhaps discomfort, the adults in the family (Figure 20F).



Figure 20. Food traditions that play with the rhythm and social norms regulating a meal or food preparation process.

In “Trick-or-treating”, the multiplicity of roles is also key, as it structures interaction between children and neighbors (Figure 20G). Other traditions involve (#19) “going through different phases” that afford different forms of playful engagement, e.g. “Krembo” (Israel) is a light meringue resting on a cookie, topped with a thin layer of chocolate, and wrapped in a thin aluminum foil (Figure 20I). It affords a three-step experience: First, removing the wrapping in one piece without damaging the foil or the thin layer of chocolate is popularly challenging. Second, the material properties of the sweet afford creative ways of eating it, leading to various theories and intense debates on which is most pleasurable. Finally, the wrap is commonly used to create tinfoil artworks, which can be used as tokens in ad hoc games.

The traditions featured above have become ingrained in people’s lives as expressions of culture. They illustrate how play-food engagements can: (1) afford enjoyable interactions with and through food materials; (2) leverage inedible food-related objects to promote social connection; (3) create new play spaces where social engagement takes place; and (4) regulate the rhythm and social norms of a social situation to enrich our shared experiences around food. The play potentials inspired by the traditions (synthesized in Figure 21) have a strong cultural grounding: they present playful experiences and interaction mechanisms that have evolved over time and have become, in different ways, part of people’s lives. Most importantly, they extend the current state of play in HFI: they show different ways in which people enjoy playing with food beyond the “aesthetics of meaningful choice” [217], e.g. exploring the ingredients, flavors and textures in a “Hot-Pot” table setup; being creative in a “Cookie-making” contest; laughing while eating “Pimientos del Padrón”; or strengthening bonds as we paint each other’s faces with the ashes that remain in our hands after eating “calçots”. These and other playful interactions illustrate how play-food experiences can facilitate social bonding in ways other than challenging ourselves and competing against each other, which seem to be valuable yet often overused play form in Playful HFI [7].

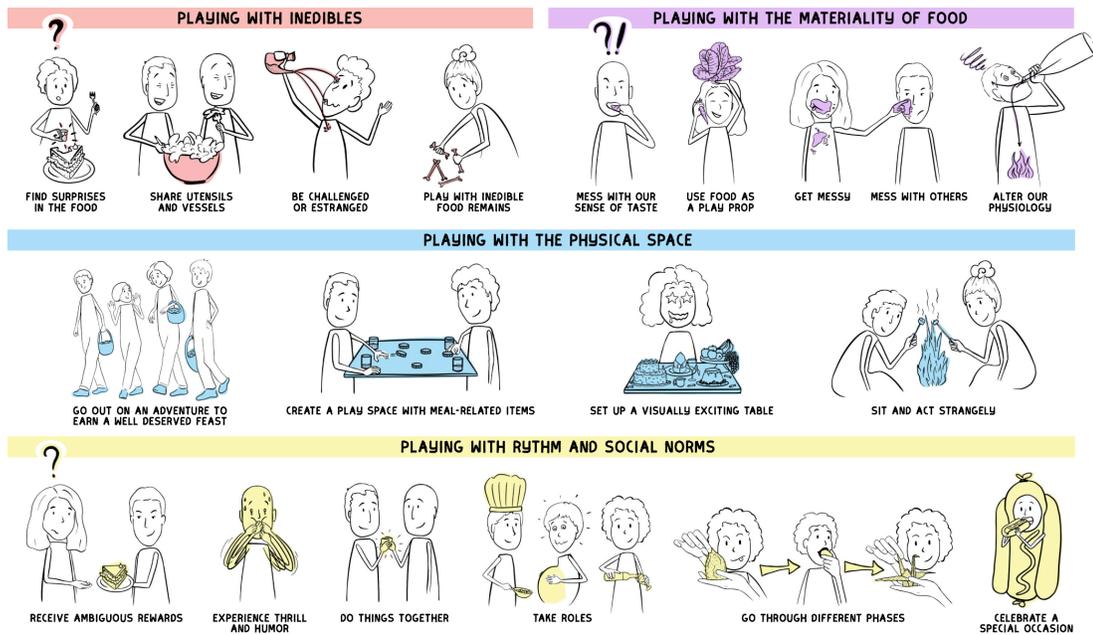


Figure 21. Synthesis of the 19 play potentials that emerged from our workshop exploring playful food culture and traditions. An online repository including a full table of food traditions and the play potentials they inspired can be accessed here: <https://bit.ly/3akecwQ>

## 5.4 A speculative catalog of mealtime technology

Building on the findings from the play-chasing interventions above, I set out explore how technology could respond to the kinds of playful eating experiences people seem to long for. Originally, my plan was to structure the ideation process as a series multi-stakeholder co-design workshops where participants built lo-fi prototypes that responded to their ideas of how play might enrich their mealtime. I envisioned the workshops to be in-person, to build on embodied and situated design methods (e.g. “embodied sketching” [165], “object theatre” [205]...) to enable stakeholders to come together and iteratively prototype design ideas. I wanted participants to not only envision and build, but also co-experience the prototypes in a shared space, so that their ideas would come not only from rational thinking but also from their direct lived experience. However, right before initiating this process, the COVID-19 pandemic broke out, and hosting in-person workshops was no longer a possibility.

Though social distancing measures made it impractical, I still wanted involve stakeholders to ensure my designs resonated with their playful cravings. I considered doing the workshops online, e.g. through “Miro”, but discarded that idea: First, participants would have to become familiar with online tools that might not be straightforward to non-designers. Second, it might make the task of co-imagining tech concepts in embodied ways too confusing for them. Most participants would likely not be trained designers, and therefore might have little experience with embodied methods to begin with. While that would also be true in in-person workshops, being co-located would allow me to demonstrate the methods in detail—a luxury I would not have in a virtual setting. Third, an online workshop would hinder our ability to use the space, tangible materials, and our bodies as co-design material, and detach us from the naturalistic context we were targeting. Fourth, it might prevent us from co-experiencing the prototypes created throughout the session, making it hard to be on the same page at an experiential level and privileging rational thinking over ideation based on lived experience. Here I describe the alternative strategy I took to respond to those issues. In Chapter 7, Section 3 I formalize that strategy into a new Situated Play Design method: “Designerly Tele-Experiences”.

In the earlier cultural probe exchanges, I noticed that participants felt more comfortable with generating ideas when presented with provocations they could experience. For example, it was easy for them to expand food-based games I proposed to them, or to even create new ones if they did not like my suggestions. In contrast, they struggled with ideating new activities from scratch, when only provided with abstract design recommendations. Their creative capacity was better supported by experiencing something playful first-hand than by learning design principles rationally. Consequently, I thought that the process would benefit from introducing my prior research outcomes (i.e. the play potentials) in ways participants could not only learn, but actually experience them. Thus, I decided to create an initial pool of design ideas to crystalize the key findings from the play-chasing phase of the project.

My goal at this stage was not to produce well-defined ideas people could only respond to with feedback. Rather, inspired by “provotypes” [36], I was after early, ambiguous concepts—ones that could be used as provocative starting points that helped people to creatively contribute ideas in a design space they likely were unfamiliar with. Four designers were involved in idea generation: my advisor, two research assistants, and myself. First, working individually, we produced a collection of 23 ideas inspired by the list of play potentials. We then clustered them by affinity to find interesting design directions and brainstormed to narrow down to a final set of 11 ideas. Throughout, we kept track of how the ideas related to the play potentials, to ensure that the resulting collection represented the breadth of our play-chasing results<sup>4</sup>.

Inspired by “design fictions” [235], e.g. the “Future IKEA Catalogue” [43], I decided to create a catalog to communicate our early ideas—not only to get people to understand what the ideas were so they could provide feedback, but to get them excited, help them relate to our tech speculations, and imagine how it might be to try them out. I wanted people to imagine what similar products they would like to see in the future, so they could help us carve this emerging design space. The resulting “Speculative Play-Food Technology Futures catalog”<sup>5</sup> was both a recruitment tool and a provocation to stimulate people’s creative response. I wanted to see which ideas (and hence, which underlying design qualities) brought about more excitement, and hear people’s thoughts on how such future-oriented concepts did or did not respond to their playful desires. Here I present the ideas in the catalog as speculative concepts that build on play potentials that emerged from my play-chasing work. Though we did not include stakeholders in the ideation process, the resulting ideas are sensitive to their food-play practices: rather than building on our own expertise or personal preferences, they instantiate

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<sup>4</sup> A table linking early ideas, shortlisted concepts, and the play potentials can be found here: <https://bit.ly/3CxsAIV>

<sup>5</sup> The full catalog can be accessed here: <https://bit.ly/2XzE8ms>

playful things they did or said in our exchanges. Importantly, at this point I was not concerned with technical feasibility; I was after a broad range of ideas (some viable, some further in future if feasible at all) that made for a rich palette of possible mealtime tech futures. In 5.6 I describe the co-design process that was enabled by the catalog, where I brought my ideas back to real mealtime scenarios and confronted them with stakeholders' perspectives.

“FoodLand” (Figure 22, top-left) is a table centerpiece that allows diners to build a virtual ecosystem with the food they eat over time. When users take a photo of their dish, food will come to life in the centerpiece as a hologram. To decide what their next meal will be, users can have a look at their centerpiece and see the foods they ate recently. If they do not keep a balanced diet, their “FoodLand” ecosystem will progressively decay.

“Food Bingo” (Figure 22, top-center) is a table centerpiece that suggests a food combination, a (probably strange) way of eating, and a person who will eat it. To use this funny food recommender, diners simply need to yell “bingo!”—the device will take care of the rest.

“Screen-ED” (Figure 22, top-right) is a mobile app that teaches people not to use their phone at mealtime. When someone uses it, an integrated projector displays funny messages on their face. Other diners can customize the messages. Thus, diners must beware of their behavior: if they use their phone screen, they will become a screen for their peers.

“PlaceMap” (Figure 22, center) is a tablecloth full of food culture knowledge. During the meal, it highlights countries and sends prompts to the diners' phones with fun food rituals from these places, so they can try them out. That way, diners can experiment with new and fun ways of eating while learning about foreign customs. Diners can choose different modes for their experience: random, if they want “PlaceMap” to decide what to feature; or themed, if they want to see rituals of a specific type or from a specific origin, to pair well with the meal.

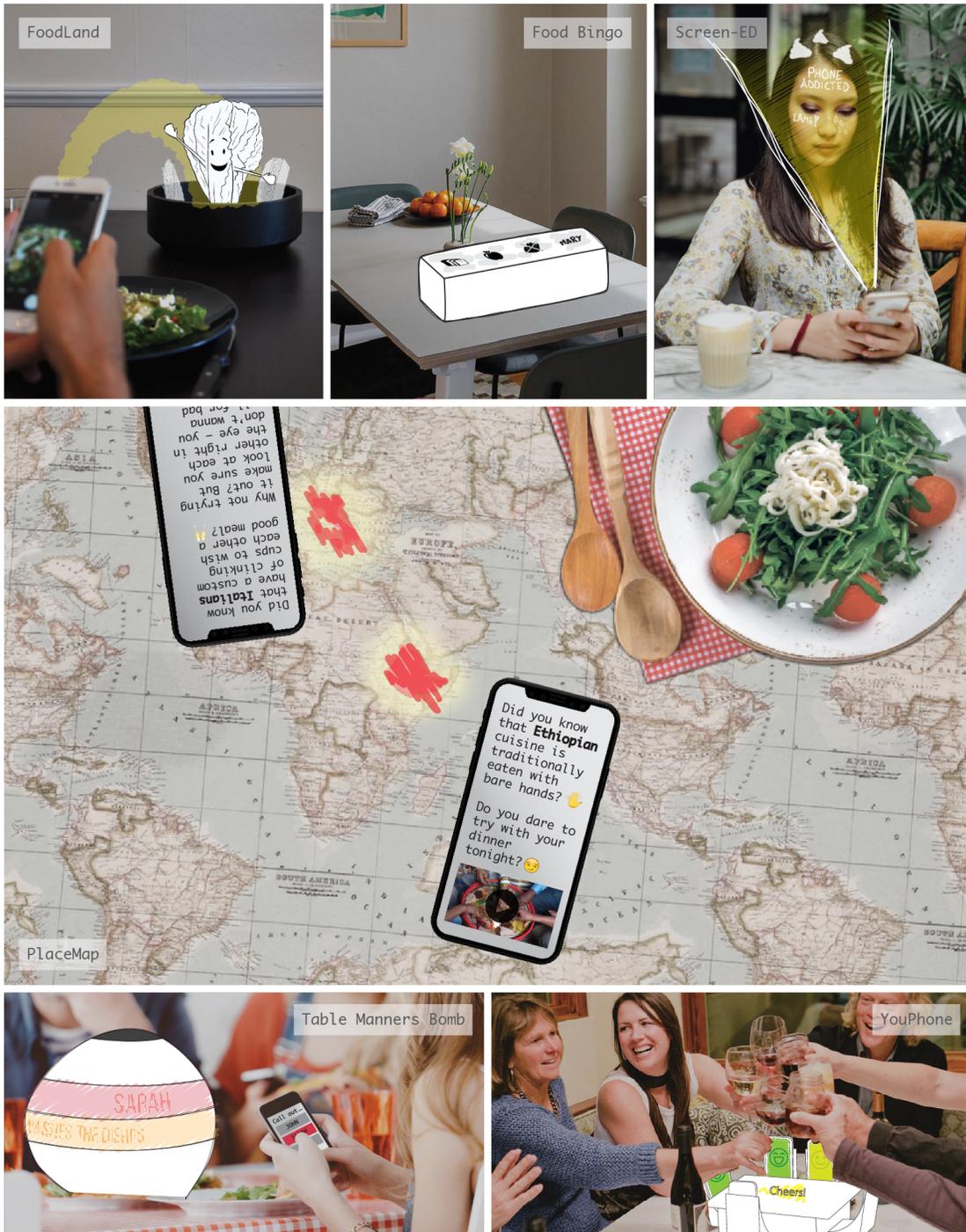


Figure 22. The first six design concepts included in the speculative catalog of playful mealtime technology: "FoodLand" (top-left), "Food Bingo" (top-center), "Screen-ED" (top-right), "PlaceMap" (center), the "Table Manners Bomb" (bottom-left), and "YouPhone" (bottom-right).



Figure 23. The last five design concepts included in our speculative catalog of playful mealtime technology. First, the components of the “Playful Tableware Series”: the “Sassy Cutlery” (top-left), the “Talky-talky Cups” (top-right), the “Bossy Plates” (center-left), and the “Anxious Plates” (center-right). Then, the “Lonely Coffee Machine” (bottom).

The “Table Manners Bomb” (Figure 22, bottom-left) is a table centerpiece that allows people to call out their co-diners—or to just mess around with them if they prefer. Whenever someone does something wrong (or ridiculous, or...) diners can call that person out on their phone and their name will appear on the screen next to a punishment. After a while, the bomb will “explode”, and whoever’s name is on the screen will be duly punished. Then, a new punishment will appear, and the cycle will start over again. The 360° camera on top of the bomb will record the diners’ reactions throughout the meal.

“YouPhone” (Figure 22, bottom-right) is a table centerpiece that serves as a phone charging station. It looks like a cute tiny replica of a dining table. To charge their phone, diners simply need to make it “sit on the table”. But that comes at a cost: as soon as they are connected, the phones will begin to imitate their owners, amplifying and exaggerating their actions to make them aware of their behavior throughout the meal.

The “Playful Tableware Series” is a collection of plates, cutlery, and cups that can be used to customize playful mealtime experiences. Using a phone app, diners can activate the devices they want to use in each meal, and set the parameters of their experience: Would they like an explorative one? Or would they rather laugh a lot? Or maybe it is a good day for messing around with one another? Whatever it is they are craving, the unfolding of the meal will be up to the diners. This collection includes four gadgets: the “Sassy Cutlery” (Figure 23, top-left) have a personality of their own and react to people’s eating interactions, either by making sounds that add amplify those actions or by talking to them. “Talky-talky Cups” (Figure 23, top-right) allow people to signal their current mood to other diners and use a flickering light to send subtle cues when their owners are talking too much. “Bossy Plates” (Figure 23, center-left) project secret messages prompting diners to act in ways that will be fun or silly, e.g. feeding one another, imitating someone else, eating strangely... “Anxious Plates” (Figure 23, center-right) get nervous when their owners do not participate in the conversation. When

diners are not talkative, their plate starts shaking. If the owner does not react, the movement accentuates, making it difficult to eat. If the owner does not change their attitude, the plate moves to another diner's area, in the hopes of finding someone who is more fun.

Finally, the “Lonely Coffee Machine” (Figure 23, bottom) is the last concept in the catalog. As its name indicates, this machine easily feels lonely and nostalgic. The only way to cheer it up is to have lively conversations in front of it. If diners want to enjoy delicious coffee after their meal, they must do their best to contribute to a delightful, shared mealtime; the quality of the coffee they get at the end of the meal will depend on the quality of their conversation. If the conversation gets stuck, the machine will provide fun facts diners can use as ice breakers.

## **5.5 Co-designing mealtime technology futures with stakeholders**

Once the catalog was ready, I set out to explore diverse perspectives on the early design ideas. I wanted to engage diverse stakeholders to collectively imagine how the technology speculations might afford mealtime experiences that responded to people's socio-emotional needs. To do that, I conducted a series of remote co-design sessions where I allowed co-located participants to experience malleable prototypes they could easily appropriate and rethink, hoping that that would help them to contribute to a (likely unfamiliar) design space. My research assistants and I recruited participants by distributing the catalog on social media (Figure 24). We presented the catalog as a collection of ideas of future food-tech, showing 2-3 examples in each post and inviting interested people to see the full catalog. Those who reached out were sent the catalog and invited to playtest some of the ideas. We scheduled one-on-one video calls with them to (1) answer questions, (2) describe the co-design activity, (3) ask which ideas they liked most and least, and (4) schedule the co-design sessions. We asked participants to recruit a group of their acquaintances to co-design with—we offered our support to make it easier for them to have that participant-ambassador role.



Figure 24. Sequence of Instagram story posts used to recruit participants for our co-design sessions.

In the co-design sessions, participants were co-located. Researchers attended via video call. Sessions were ~2h long and unfolded as follows: First, we had an introductory conversation (~15 min.). We described the project, ensured participants understood the procedures, and answered questions. We also invited participants to share their early ideas about the catalog, so we could begin to gauge their reactions.

After the introduction, we moved on to a meal (~1h) where participants experienced their choice of a technology from the catalog. During the meal, we moved behind the scenes to enact the prototype and allow the meal and social interactions to unfold more naturally. We muted our microphones, turned off our camera, and used screen-sharing to turn the participants' computer into a representation of the prototype. For example, to prototype "PlaceMap"—a smart tablecloth displaying a world map that highlights parts of the map and sends playful food traditions from those locations to participants (see Figure 22, center)—we did not build a technological tablecloth. Instead, we shared our computer screen displaying Google Maps, to indicate location changes, and used "WhatsApp" to send playful food traditions to participants' phones (Figure 25). Once participants decided the meal was over, we moved on to the third phase of the session: a conversation (~30 min.) focused on unpacking how participants experienced the prototype. Here, we stopped enacting the prototype and returned to our facilitator role. To use people's fresh experience of the

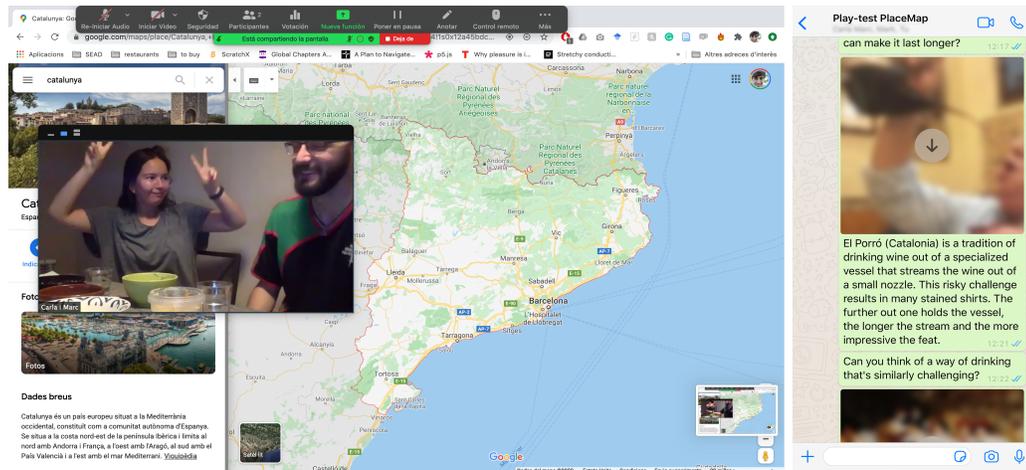


Figure 25. “PlaceMap” in action. Left: Screenshot of the view from the designer’s side, including a Google Maps interface (also visible on the participants’ end) and a small window displaying the feed from the participants’ camera. Right: Screenshot of the shared WhatsApp channel where some of the food traditions were sent.

prototype and stimulate a creative response, we invited participants to share their thoughts about the mealtime they had just experienced. Then, we encouraged them to build on and rethink the prototype—or to discard it and come up with new ideas altogether if they preferred. We took notes throughout the sessions, which we later analyzed through “inductive thematic analysis” [40]. We also video recorded the sessions and analyzed them using an “interaction analysis” approach [143].

Overall, we conducted 13 co-design sessions and involved 37 participants. 9 countries were represented: Spain, India, USA, France, the Netherlands, Belgium, Germany, Russia, and Mexico. Participants had different relationships: friends, couples living together, families with older children, or housemates. 6 of the catalog ideas were selected by participants to be play-tested: “PlaceMap” (6 times), “Table Manners Bomb” (2), “Talky-talky Cups” (2), “Sassy Cutlery” (2), “Screen-ED” (1), and “YouPhone” (1). Below, I share the most relevant findings from this process, using the convention S to refer to the sessions (e.g. session 7 is “S7”). The findings, as well as the speculative catalog and the contextual research insights that motivated it, were published as a full paper at CHI Play 2021 [16].

### **5.5.1 The playful potential of “fun facts” to promote pro-social activity**

We observed that, by delivering relevant information, some of the prototypes stimulated lively conversations. When prompted with relevant “fun facts”, people reacted in pro-social ways, e.g. when “PlaceMap” provided food traditions, people often talked about them (S9), used that as an opportunity to share stories or traditions of their own (S3&4), or responded more actively by enacting the traditions (S4) or inventing new food games inspired by them (S6). Overall, “fun facts” showed great potential for stimulating social food-play—which aligns with findings from related literature that suggest technology can add value in social food situations if it delivers communal experiences [56][73][95][96][97][182]. However, some participants had concerns with the delivery channel. Many of our ideas used phones as the interface, which created tensions: even when used to deliver facts to stimulate conversation, phones tempted people to individual uses that were socially disruptive (e.g. checking social media). S3&9 suggested avoiding individual technology use, e.g. only using one phone at the center of the table or substituting phones for dedicated device that only affords collective use.

### **5.5.2 Who should drive the rhythm of a play-food experience?**

In many ideas in the catalog, technology played an important role in setting the rhythm of the experience. We quickly realized that people might prefer to have more agency on that front, especially regarding pace and timings. When it came to those qualities, our prototypes fell short in many ways. For example, S3,4&9 thought “PlaceMap” was too invasive: it imposed a rhythm that was too intense and forced diners to constantly jump from one food tradition to another, even when they did not want to. They suggested alternative approaches, where diners (as opposed to the technology) could choose when (and when not) to request a playful prompt. S2 were also critical about the role of technology as a driver of food experiences. After trying “Screen-ED”, they proposed to frame technology as an invitation to social play

that diners may or may not pay attention to; one that should not be seen as an imposition but as something that sits on the background and can be paid attention to only when the diners want. S5 discussed the implications of disrupting ongoing conversations: building on their experience of “Sassy Cutlery”, they stressed the risks of interruptions that are not contextually sensitive. They suggested paying close attention to: How is the technology disruption fun? What meaningful conversations might it displace? Is that tradeoff desirable?

Interestingly, we found that misalignment in the rhythm of play-food experiences did not only occur between diners and the technology; it also emerged between the diners themselves. For example, in S12, a diner felt that the pace set by “PlaceMap” was too slow, while others appreciated the time between prompts to enjoy their food. We also observed situations where participants enjoyed concrete ways in which technology took the initiative. For example, S4 visibly enjoyed themselves when “PlaceMap” interrupted with new food traditions that were relevant to the conversation topic. Other participants enjoyed when technology playfully teased them, e.g. in S8 there was an occasion where the “Table Manners Bomb” arbitrarily (rather than prompted by another diner, as was the usual mechanism) punished a diner, to the enjoyment of others; or in S3 “PlaceMap” sent a tradition that involved “making the drink last longer” right when a diners’ cup was almost empty, which initiated an unfair competition that made the party laugh. In S7, some technology-driven prompts also contributed to the quality of the social experience, e.g. in moments of awkward silence, they appreciated that the “Table Manners Bomb” “decided” to explode and revitalize the conversation.

An important take-away from our work is that, rather than being told when to play and when not to, people appreciated to have a degree of control over the unfolding of events. They proposed ways of reclaiming that decision-making capacity, e.g. through a button for asking “PlaceMap” to move on to the next tradition (suggested by S4,9&12). While some people enjoyed being guided more than others, it may be a good design decision to provide agency

when it comes to the rhythm of food-play experiences. It may also be interesting to create strategic moments for tech-driven interventions, in situations where it is technically possible to read the social situation and intervene in contextually meaningful ways (e.g. when there is a prolonged silence). Importantly, current technology may not yet be capable of sensibly intervening in scenarios of a more complex nature; I suggest the need for more technical research that enables food-tech designs to better read a social situation and intervene in ways that do not disrupt, but rather enrich, people's ongoing conversations and interactions.

### **5.5.3 Towards technology that plays an active role and is socially aware**

Participants seemed to enjoy interacting with technologies that appeared as not neutral, i.e. that seemed to have an agenda and/or a personality. For example, S4 wanted "PlaceMap" to be a sassy character they could tease: they often taunted it, daring it to propose traditions that were crazy enough to discomfort them. They also pretended to be able befriend the device, as if it were a living thing. After receiving more individual prompts than their partner, one of the diners celebrated "oh, I got a personal one!"; the other answered "you got another one?", to which she responded "yes, I'm special". In S8, participants quickly became used to playfully blaming the "Table Manners Bomb" for being partial, and tried to entice it to punish others, as if the tech had its own agenda. Similarly, in S7, a diner felt that the "Table Manners Bomb" was deliberately targeting him, and reacted by flipping the middle finger to it. I was operating the prototype behind the scenes and reacted by increasing the punishment, which led to a hilarious moment all the diners enjoyed (including the participant who was punished).

Importantly, the technology's involvement as an active "being" only made sense when it was contextually sound. Several participants noted that they wanted the technology to be context aware. For example, S12 appreciated that, at the beginning of the experience, "PlaceMap" prompted them with food traditions that made sense in the context of the beginning of a meal,

e.g. clinking glasses. Similarly, S13 proposed that “Sassy Cutlery” was attuned to people’s emotions to enhance them. From a technical perspective, it may still be complicated to develop technologies that are able to read a social situation and actively participate in it; I highlight the need for technical research that provides designers with new possibilities in this space. In the meantime, I suggest designers focus on designing technologies that carefully intervene in concrete situations they can control or, alternatively, leave it to the diners to decide when they should participate, rather than carelessly disrupting people’s conversations. I also suggest that there is a huge opportunity to further explore how to design tech that can be perceived as a living thing with the capacity to intervene in the social space; it is a largely underexplored design space that may unveil interesting opportunities for playful intervention.

#### **5.5.4 The importance of encouraging messy, embodied, hands-on food interactions**

In the spirit of focusing people’s attention on their in-the-moment engagement with the meal, we found it important to encourage them to get hands-on and experiment with their food. S12 noted that “PlaceMap”’s prompts of eating with their hands made the meal more satisfying and argued that this design can help people to find ways of eating that are more fulfilling and sensual. Yet, they also talked about the importance of being aware of cultural idiosyncrasies and designing for diverse levels of (dis)comfort, e.g. they noted that they all felt comfortable with eating with their hands because it was common in their culture, but thought that others with different lived experiences might not; they also noted that one of them felt grossed out by the idea of burping as a show of appreciation (as is common in many Asian countries), while others found it extremely fun. In S6, the embodied and messy nature of the prompts delivered by “PlaceMap” contributed to bringing people together: by inviting the diners to eat in strange, unusual ways, it helped them to focus on enjoying each other’s company and brought about a great deal of laughter—often, by allowing the diners to act in performative, silly ways. Interestingly, participants also highlighted the potential of technology to create moments for

pause where they could take a break from eating. Recalling a “PlaceMap” tradition that prompted people to throw paper into each other’s cups, S12 suggested that creating a pause in eating opened a window of opportunity for both socializing and helping their bodies to digest. Food-play technology might benefit from inviting diners to fluctuate between eating and resting, to the benefit of both the social and the bodily mealtime experience.

### **5.5.5 Engagement depends largely on the idiosyncrasies of diners and their context**

Finally, we observed differences between people’s ways of approaching, experiencing, and reflecting on our proposed food-play experiences. Different groups leaned towards different forms of play, e.g. while S9 preferred open-ended prompts that privileged explorative and conversational play, S8 called for robust game-like rules that allowed them to compete, tease one another, make each other struggle. Likewise, some groups responded actively to the technology prompts (S4,6,7&8) while others took a more conversational stance (S2,3&9). Even within a group we observed different ways of reacting to the prototypes, e.g. in S1, some people actively enacted the traditions proposed by “PlaceMap” while others simply commented on them. From a design perspective, a useful strategy for responding to such diversity of approaches might be to allow space for appropriation: framing technology as an invitation rather than an imposed experience, a tool that allows diners to craft their very own play experience in ways that feel meaningful to them. In my experience, allowing people to “finalize” the technology and have a say in their functionality led to contextually meaningful fun and laughter, e.g. when S7 came up with their very own way of telling us that their “Table Manners Bomb” meal was over: “screw the bomb!”. Existing works have explored how to design tech that is flexible and allows space for interpretation (e.g. [107]’s “ambiguous design”) and user appropriation (e.g. [139]’s “suppleness”). Designers should consider how to leverage those principles to create technology that acts as a graceful facilitator: an appropriable device that allows people to project their very own playful cravings.

## **5.6 “PlaceMap”: an app designed to support collective food-play**

Building on the outcomes of the above co-design process, I decided to iterate on one of our early design ideas and develop a fully functioning prototype. I chose the “PlaceMap” idea as a starting point as in the co-design phase it was the best received by participants. My team and I noted that in two ways. First, quantitatively: 6 groups decided to test “PlaceMap”, while other ideas were only selected twice or less. Second, qualitatively: most people (including participants who chose to experience other concepts) reacted positively to it. Such good reception encouraged us to continue with this design direction: on the one hand, it signaled people found the idea appealing, which was in and of itself a good reason to further develop it; on the other hand, having done more co-design sessions centered on this idea gave us more information about it that we could use in our subsequent concept design iterations.

### **5.6.1 Rethinking “PlaceMap” based on the co-design learnings**

We embarked on a series concept design iterations where we modified, extended, and concretized “PlaceMap” to get it ready for prototyping. Two designers were involved in this phase: a research assistant and I. We began by thinking about how to apply, where useful, the learnings from the co-design phase to extend the original concept—to ensure that the second iteration of the concept was grounded in our stakeholders’ contributions. Our first co-design learning indicated that delivering fun facts was a powerful mechanism for stimulating pro-social activity. That design quality was already present in our original idea, so we did not have to make significant changes to reflect it. The second learning suggested it might be best to allow people to dictate the rhythm of the experience. Here, we had margin for adaptation: In the original concept, it was the technology who chose when to intervene and what prompts to deliver. Participants suggested to shift the roles and enable people to determine the unfolding of the events. We decided that in the next iteration of “PlaceMap” people would

have more control over both the pace and contents of the experience. That choice was also motivated by the last finding from our co-design sessions, which told us that engagement depends largely on the idiosyncrasies of diners and their context. By handing the control of the pace and contents of the experience over to diners, they would be able to appropriate the technology to fit the idiosyncrasies of their own meal. Rather than delivering a closed, well-defined experience, we would provide a tool for people to craft their own—a move that we hoped would support more contextually-meaningful forms of emergent playful engagement.

The third of our co-design learnings was trickier in the context of “PlaceMap”. It suggested that technology should play an active role in food-play experiences by showing some degree of agency and being socially aware. In our play-test sessions with the original “PlaceMap” prototype, we found that it was even hard for us (humans with better and more nuanced social skills than today’s state-of-the-art computational artifacts) to intervene graciously during someone else’s meal. To avoid interventions that felt like disruptive interruptions, and building on the above decision of transferring the decision-making power from “PlaceMap” to people, we decided not to provide the new prototype with a personality or a capacity to actively participate in a social situation. In contrast, the fourth co-design learning was both relevant and applicable: it suggested that playful mealtime tech should encourage messy, embodied, hands-on food interactions between diners. While the original “PlaceMap” prototype already did that via provocative text messages, we wanted to further stress this quality. To that end, we decided to shift the balance between textual and visual communication and try to communicate the food traditions more through illustrative, visceral, funny, replicable images than through text. Our hope was that, by looking at how other people engaged in the traditions and enjoyed them (rather than just reading about it), diners would be more compelled to get their hands dirty and try them out.

## 5.6.2 The final “PlaceMap” prototype

Building on the findings described above, we redefined the “PlaceMap” concept, both in form, function, and structure, to better respond to our stakeholders’ ideas. Here I describe the final design<sup>6</sup> as well as a set of relevant design choices we made based on the findings from our co-design work. I developed the final prototype in collaboration with two research assistants. The final version of “PlaceMap” is an app<sup>7</sup> that allows co-located diners to learn about and experiment with playful food traditions from all over the world. It functions like a repository of food culture (Figure 26A): whenever people want to check out a tradition, they get a selection of three options, from which they can choose one (Figure 26B). Then, a minimalistic screen (Figure 26C) delivers basic information about the tradition: an evocative full-screen image, the name and origin of the tradition (on text), and a short description of the tradition (via

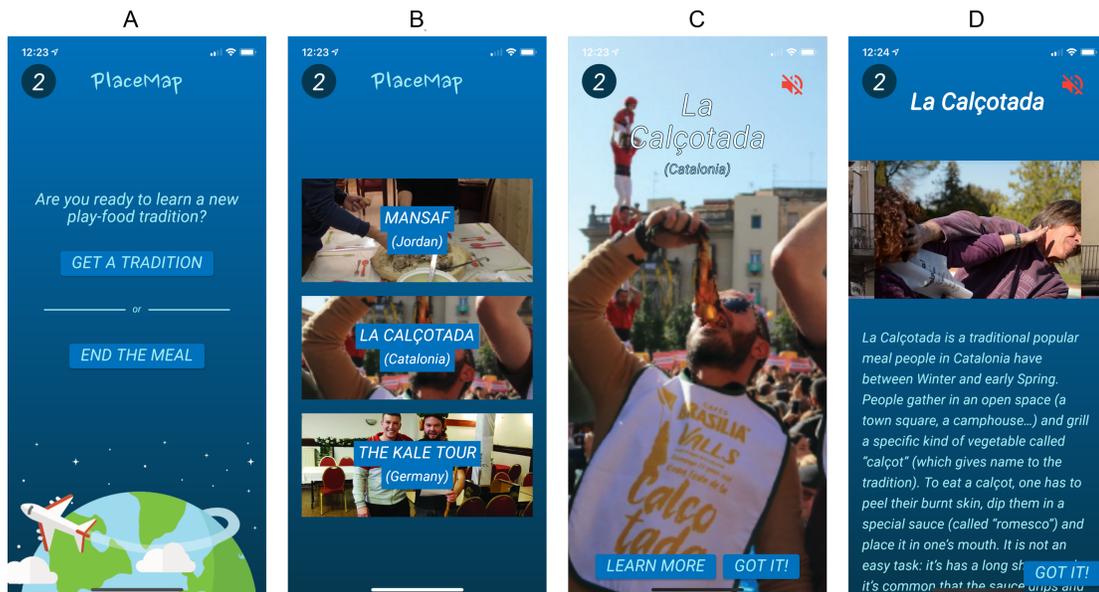


Figure 26. How to navigate through traditions in the final “PlaceMap” iteration. A: main screen, where diners can request a food tradition. B: diners get a choice of three traditions to choose from. C: basic tradition screen, featuring the name and origin, and an evocative image. D: screen with additional information about a tradition.

<sup>6</sup> A flow diagram featuring the full UX design of the app can be accessed here: <https://bit.ly/3ztOh1x>

<sup>7</sup> A fully functioning prototype is available, both for iOS (<https://bit.ly/placemapios>) and for Android (<https://bit.ly/placemapandroid>).

audio). We decided to privilege audio-visual output over textual information to avoid prolonged individual phone use, while still delivering all the necessary information. Information on the screen should be enough to get a grasp of the tradition, and to discuss or experiment with it. Yet, if people want to learn more, they have the option of accessing extended information about the tradition, in the form of a more traditional screen featuring a longer text description and a series of photos and/or videos (Figure 26D).

Once diners feel they know enough about the tradition, they can press a button to let the system know (Figure 27A). Then, information disappears and the app prompts diners to put their phones aside for a while and do something related to the tradition (Figure 27B), e.g. talk about it, try it out, share similar experiences... Once they are done, diners have three options: First, they can choose to find a new tradition, in which case they will get a choice of three traditions and the whole cycle will start again. Second, they can choose to take a break and stop using the app for a while, in which case they will open an idle mode screen. Finally, they also have the option of rating the tradition they just learned about, in which case they will

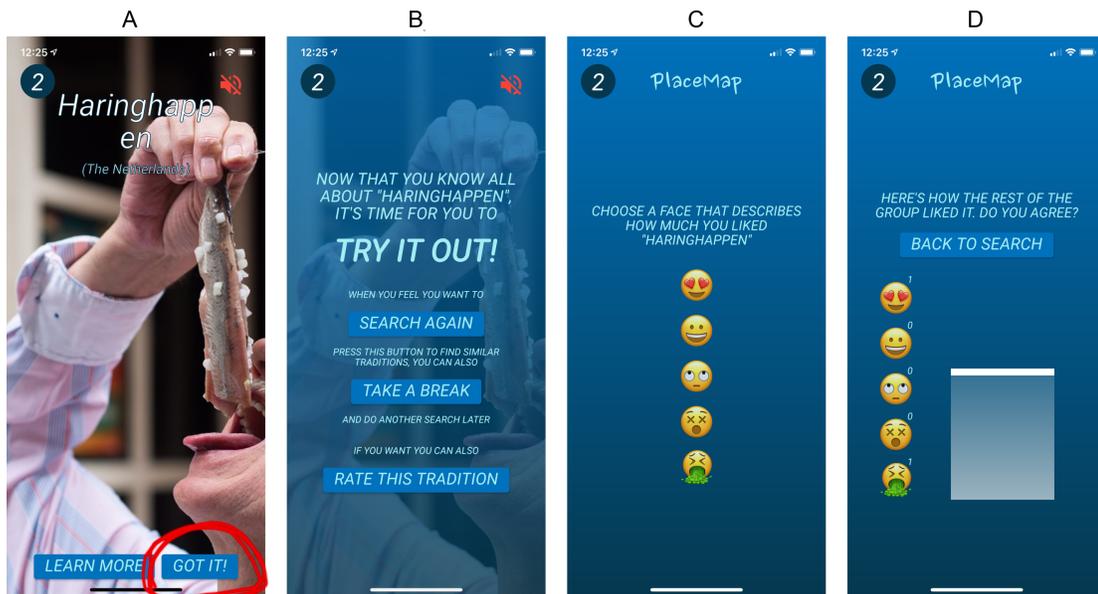


Figure 27. What to do about traditions in the final “PlaceMap” iteration. A: a red circle highlights the button to let the app know you already know enough about a tradition. B: screen prompting diners to do something about the tradition. C: rating screen. D: screen featuring all the diners' votes.

be given the option of choosing an emoji that best describes their thoughts about the tradition (Figure 27C) and will then see what their co-diners voted (Figure 27D). We decided to incorporate this optional rating mechanism because both in the play-chasing and co-design phases of the project we observed that some people enjoyed playful confrontation; we thought enabling them to vote on the traditions in a playful way might occasionally bring up conflicting opinions and lead to playful teasing among diners.

That covers the basic functionalities of the new “PlaceMap” iteration. In short, the app allows people to navigate at their own pace through a collection of playful food traditions, to take their time to do whatever they please related to those traditions (e.g. learn, talk, play with, or share stories related to them), and to rate those traditions if they want. A controversial design choice we made was to use phones as the cornerstone of this design idea. In our co-design sessions, we learned that some participants thought phones were not a desirable interface for shared food-play experiences, as they afforded individual uses and tempted people to use them for other purposes than the shared activity (e.g. checking social media). Thus, it may seem counter-intuitive to use them as interfaces for a design centered on promoting hands-on, communal food-play. However, we thought phones have qualities that are relevant to our design context: they are accessible and virtually universal (i.e. most people have them already), they are transportable and adaptable to any dining scenario, and they do not involve producing new artifacts or generating any unnecessary material waste. We also thought trying to design a communal play experience using devices that are often seen as individualistic was an exciting challenge; we decided to take it on. Hoping to deliver a phone-based experience that was nonetheless group-oriented, we decided to add two other functionalities to our app to better support food-play behaviors that were performed in group:

First, we decided to make the navigation of content collective. When a player performs an action within the app (e.g. choosing a new tradition) everyone’s phones react accordingly

(e.g. featuring the same tradition on everyone’s screen). That way, even if people use their phones individually, they are all consuming the same information, and hence they have a shared experience. We thought that such unusual collective navigation of information might also lead to emergent playful situations, e.g. people having to negotiate who takes the lead, or competing over who chooses a tradition first. To synchronize phones, we incorporated a screen where, right when opening the app, people can create a shared session (Figure 28A).

Second, we decided to propose some kind of “social pact” to players, i.e. the agreement to not use any other app than “PlaceMap” during the meal. To allow players to play with that social pact at their own convenience, we decide not to enforce it by design. That is, we did not hard code a lock that disabled closing the app. People are free to jump in and out of it if they want to, e.g. to check their social media or email apps, but that goes against the social pact we propose and therefore is at odds with the implicit rules of the meal. To give the group a way of discouraging those kinds of behaviors in ways that do not feel uncomfortable, we designed a mechanism for people to know when someone is using an app outside of

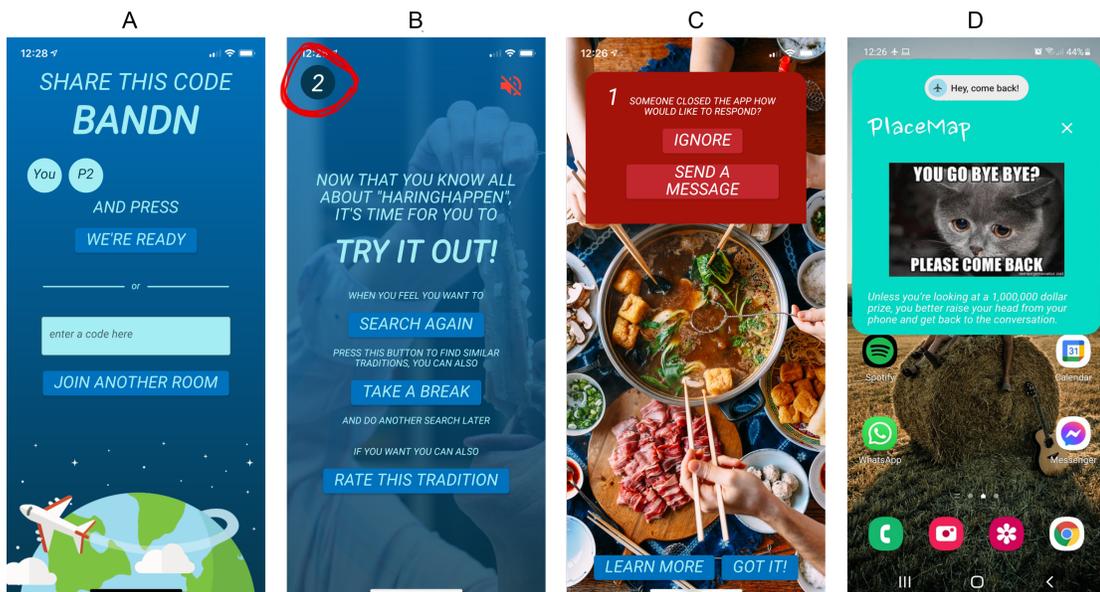


Figure 28. Functionalities of the final “PlaceMap” iteration meant to stimulate communal uses. A: the mechanism to synchronize phones. B: a red circle highlights the number indicating the amount of active players. C: an alert received when a player leaves the app. D: a notification prompting someone to go back to “PlaceMap”.

“PlaceMap” and to playfully prompt them to come back. First, at the top-left of the screen, players always see a number indicating the number of active players with the app open (Figure 28B); if someone leaves, the number will decrease. Second, if a player leaves “PlaceMap” to do something else on their phone, that sends an alert to all the other players (Figure 28C). They then have a chance to send a funny message to the player who just left, who receives it as a push notification along with a funny meme related to the themes of “coming back” or “ignoring people” (Figure 28D). With that rather unusual design choice—an in-app mechanism for playfully policing people who used phones for individualistic reasons—we wanted to discourage people from the temptation of using phones individualistically. Most importantly, we wanted to provide the group with a playful, gracious, and easy mechanism for re-engaging (rather than punishing) people in case they could not avoid breaking the rules. Finally, to make sure people understood the basic functioning of “PlaceMap” and to clarify some of our rather unusual design choices, we created a tutorial players go through at the beginning of the experience. The tutorial describes the social pact and the functionalities around it and introduces players to the basic idea of what the app is trying to achieve.

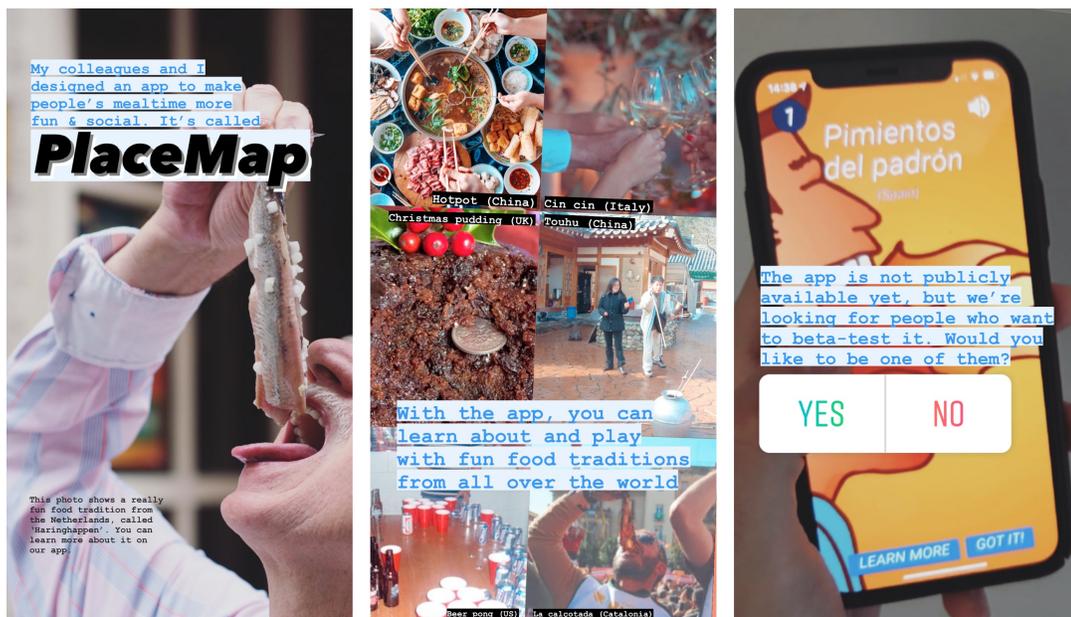


Figure 29. Sequence of Instagram stories we used to recruit participants for the user study.

### 5.6.3 User study design

To test the new, fully-functioning “PlaceMap” prototype, and to explore the impact of our design choices, we designed a user study in the wild. The aim was to see how people would use and experience the app in their own mealtime, without my presence or influence of any kind. My research assistants and I recruited participants on social media, following a similar approach to that of previous phases of the project (Figure 29). Once people showed interest, we held one-on-one videocalls with them to describe procedures, help to download the app, and guide them through the basic functionalities. We also sent a digital postcard (Figure 30) with basic information about the user study and links to download the prototype. We did not enforce a specific way of using “PlaceMap”; rather, we introduced it as a technology they could use at their own convenience at mealtime, to do whatever they pleased with it and to pay attention to it only whenever they wanted.



UCSC IRB protocol # HS3631

## Thanks for participating in our study!

If you received this postcard, it means that you accepted to participate in our user study of **PlaceMap**, a phone app that's meant to stimulate playful and social interaction at mealtime. Thanks in advance! Here you'll find all the information you need in order to participate in the study. Long story short, we want you to download the PlaceMap phone app, play with it, and share your experience with us. You can do it independently, without our presence, whenever you like. Our only requirement is that you do it during mealtime and with other people. Make sure that all participants in the meal have the app installed on their device before you start. The instructions below will guide you through the study procedures. If you have any questions, please reach out to [faltarri@ucsc.edu](mailto:faltarri@ucsc.edu). Thanks again! We hope you have fun playing with the app :)



## Instructions ID: 1

<h3>Before the meal</h3> <ol style="list-style-type: none"><li>1. The first thing we'd like you to do is find a group of people with whom you want to test PlaceMap. It can be anyone you want: family, friends, partner... Up to you!</li><li>2. Then, you should make sure that everyone downloads the PlaceMap app on their phone. The app is not available on the App Store or on Google Play, you'll find it on the following links:  <i>For iOS:</i> <a href="https://bit.ly/placemapios">https://bit.ly/placemapios</a>  <i>For Android:</i> <a href="https://bit.ly/placemapandroid">https://bit.ly/placemapandroid</a></li></ol>	<h3>During the meal</h3> <ol style="list-style-type: none"><li>3. You will have a normal meal, with the only addition that you'll use PlaceMap. You don't have to play with it all the time, or use it in a specific way. Please use it however you and your meal buddies feel like! There is no right or wrong.</li><li>4. If you'd like, you can use the camera functionality of PlaceMap* to take photos throughout the meal. We'll invite you to send those photos later, in a post-meal survey.  <small>*Unfortunately, that functionality is only available for Android users.</small></li></ol>	<h3>After the meal</h3> <ol style="list-style-type: none"><li>5. After the meal, we'd like all participants to share their experience with us through an online survey. It shouldn't take longer than 15 minutes and will help us a lot. Here's a link to the survey:  <a href="http://bit.ly/placemapsurvey">http://bit.ly/placemapsurvey</a></li><li>6. We also expect to have a follow-up video chat with the host of the meal. The other participants are also welcome if they feel like participating. In that conversation, we'll ask some questions about the playtest, to get a better understanding of what happened and how you experienced it. Once you've done the playtest, please let us know when you're available so we can schedule the conversation.</li></ol>
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Figure 30. Postcard with information about the user study.

After the informational videocall, we gave participants some weeks so they could playtest “PlaceMap” whenever they thought was appropriate. They played with it on their own, at least once, and then answered an online survey<sup>8</sup> to report on their experience of the prototype. We asked all participants to answer a separate survey, to ensure we collected different views on each playtest. Some participants also accepted to be interviewed afterward, over videocall, while others preferred to answer some additional questions via e-mail. We used those semi-structured interviews to ask additional questions that may have not been fully answered yet, and to add nuance to some of their interesting survey comments. To analyze the data, we used an “inductive thematic analysis” approach [40]. Three researchers had a first exposure to the data (both the survey responses and the interview transcriptions) and identified a emerging themes. We then had a group conversation, where we discussed our themes and agreed on a shared list of codes. Then, we did a second round of analysis where we clustered the data based on these codes. Below I share our most relevant findings, hoping that they will inspire other designers interested in developing similar systems to “PlaceMap”.

#### **5.6.4 Results**

7 households participated in the user study, with a total of 14 participants. They were from, were living in, or had lived in 17 different countries, including: the US (7 participants), India (2), Germany (2), Belgium (2), the Netherlands (2), Spain (2), Finland, Canada, Ukraine, Czech Republic, Sweden, China, Australia, the UK, Singapore, Oman, and Taiwan. One participant chose not to disclose the countries they had lived in. Most participants (8) did the playtest with their partner, although some did it with friends (4) or with their family (2). All participants but one answered the survey; 2 participated in a follow-up interview and 2

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<sup>8</sup> The survey can be accessed here: <https://bit.ly/placemapsurvey>

answered our follow-up questions by e-mail. The results of this study have not been published yet; they will be submitted as a full paper to a special issue journal focused on experiential factors of Human-Food Interaction. Here I present the most relevant findings, focusing on those that are most relevant from the perspective of design. I use the convention S to refer to the different playtest sessions the data comes from, e.g. S7 means session 7:

**Learning new food traditions can enliven conversations and stimulate the social dimension of a meal—if not delivered in excess.** Many participants noted positive effects from using the app. First, it prompted some to approach the meal as a celebratory event: “it was an excuse to make dinner an occasion rather than just snacks” (S1). For others, it had a deeper impact as it helped them to “bond over [the] app” (S2). In particular, the mechanism of accessing fun traditions from all around the world seemed to engage participants and enable interesting social dynamics. That happened in different ways: Some traditions stimulated lively discussions, e.g. “I must confess, the burping thing triggered a conversation on cultural differences in politeness and rudeness.” (S2). Others simply provoked a situation that allowed participants to be playful with the social situation, e.g. “[I enjoyed the] elder one eating first. I am the elder one so I could show some dominance, that was funny” (S4). There were also times when people engaged with traditions more actively, especially when they found them relatable, e.g. “it was fun eating with my hands and clinking our asparagus (because we didn’t have drinks)” (S1). Finally, participants also enjoyed building on the traditions proposed by “PlaceMap” to “shar[e] some traditions from [their] own country” (S6). Even if they found it fun and socially stimulating to learn about traditions, participants noted that structuring the whole meal around it could be too much, as centering too much on the traditions might push people to “focus on the app instead of on the actual social interaction” (S2).

**The importance delivering relatable, actionable, and playable information.** Though participants generally enjoyed traditions as a catalyzer of social interaction, there were

several instances when “the app wasn't really applicable to the situation. It didn't seem like everything we had to do to play test the game kind of detracted from the meal” (S5) and, as a result, it felt “distractive to use an iPhone to do something irrelevant to [the] meal” (S3). That mostly happened when the information provided by the traditions was not actionable enough and it was unclear “how [they could] perform these traditions” (S4). On occasion, that was because the very traditions “were not really applicable to the meal” participants were having (S5), which made them feel they were “very random and intrusive” (S5). As a result, some ended up limiting their engagement to reading (rather than experiencing) the traditions: “just swiping or being like, okay, let's see a tradition, rather than trying to engage with one tradition, fully, besides just reading what's there” (S4). For some, “it was also easy to get into the route of ‘Okay, this tradition. Let's see. Next one. Let's see. Next one’” (S4)—something diametrically opposed to the intended experience. Participants provided suggestions to address this issue, mostly geared towards providing “more guidance on what should be on the table, and how [they could] perform these traditions” (S4). One of the suggestions had to do with helping participants to be prepared for the experience, before the meal, by providing a list of foods/utensils that might be necessary to enact the traditions: “if we had all the tools a priori needed to take part in the different traditions, [they] would have enjoyed it more” (S4). They suggested that list should not be too long or exhaustive, but rather allow participants to have the bare minimum that would allow them to play with the traditions: “like here, have these three kinds of dishes on your table for this meal... It doesn't have to be very specific, it can just be very generic meals, like a salad or a protein, something that people can play around with” (S4). Another suggestion made by participants had to do with helping users figure out how to appropriate traditions and enact them in their own mealtime, as “not every tradition is easy to just instantly incorporate into your meal, so you have to get creative or give up” (S1). Even when people pressed the “learn more [button], it didn't really clearly tell you what the app wanted [them] to do” (S5). In response, (S7) proposed to provide “more

questions, making people act, start trying out the traditions instead of mostly informing". (S5) suggested a way of achieving this: getting rid of so much content about each tradition and present users with a "comic style 'how-to'" instead, to make it easy and actionable to play with the traditions. Overall, those changes might allow us to implement (S7)'s request to "have some more interaction [and] assignments".

**Content should be carefully curated and interactive.** Participants thought the app provided too much content, especially in the tutorial: "it took too long for users to get into the real session (food traditions)" (S3). As a result, they "felt a bit lost at beginning" (S3). Some suggested to get rid of the tutorial and start directly with the actual experience, "as with or without it will not change too much how [they] would use the app, [they can figure out just by trying, and if [they] need help [they]'ll look for a 'help' button" (S3). Participants also thought it "[took] too long to listen to and read traditions" (S5), as there was too much content: "The presentation is playful. The explanations are very long though!" (S7). Long videos were also described as "highly distracting" (S1), as they "made for an awkward pause in chatting" (S1). However, paradoxically, that abundance of content did not help them to appropriate the app and get onboard the experience: "It was not clear what to do and what users would expect with the app" (S3), and "it was hard to understand how much of an involvement [they] could have" (S4). The excessive amount of content, paired with its failure to encourage participants to act, made some participants overlook the playful dimension of the app: "reading a lot of instructions and pressing buttons did not really feel playful" (S2).

**Phones might not be the best interface for mealtime technology, especially in meals involving two participants only.** Many participants did not enjoy the way the app facilitated the meal because they "[didn't] like using tech during dinner" (S5) to begin with. They noted they "usually don't use [their] phones during meal times" (S1) because it "disrupts mealtime" (S5). Some participants framed that tension as more specifically linked to phone use: "I don't

like to touch my phone when eating” (6). According to them, the app generally distracted them from the actual conversation: “we focused on the app instead of on the actual social interaction” (S2). The experience felt too individual, “required a bit too much attention” (4) and prompted people to “keep looking back at the screen” (S5). That was, in part, a consequence of the fact that the experience was delivered through phones: it “made [people] focus on the phones” rather than on each other (S2). As a result, participants felt they were not “able to have a personal conversation”, that they “couldn’t discuss [their] own topics” (S3). Some participants suggested re-designing the app so all participants shared a single screen: “if it was sharing one screen, then it would be better, because then we could all look over it” (S5). They also argued that this tension was exacerbated by the 1 on 1 meal situation, a “during a 1on1 dinner, it was very disruptive” (3), and that “it would be more fun with more people” (S4). On a similar line, (S7) “would only use it in larger groups as I often have a really good conversation with my partner and I cherish that”. Unfortunately, we could not corroborate that as all participants decided to playtest the app in a group of 2 people only.

**Participants appreciated having their phones be connected.** Initially, they were “a bit ‘shocked’ that [their] phone was not completely under [their] control as [they were] being watched” (S3). Yet, they thought that “the linking of all phones is one of the greatest values of the game, because you know what everyone else is seeing and that nobody is able to do something else (without a notification appearing)” (S6). Some pointed out that this is an increasingly common mechanism in phone games, which we only brought one step further: “I had no problem with my phone responding to someone else's actions. I already got used to that with JackBox games” (S3). A participant found the shared information consumption to be playfully frustrating: “It was funny although a bit frustrating, because sometimes we would already go to the next tradition whereas I wasn't done yet. It becomes more this game of 'who is in control' then 'let's find out more information about tradition’” (S6). Another participant

noted how that brought about playful teasing between them and their partner: “it was easier for me to tell him, you’re not going to touch anything on your screen [laughs]” (S4).

Participants also enjoyed “sending messages when someone got out” of “PlaceMap”; it was not only “fun”, but it also “provided a topic to talk about” (S6). A participant suggested an alternative mechanism: “maybe it would be fun that the game shows the screen of the person who is doing something else, so that we can all follow why that person is distracted” (S6).

**Designs like “PlaceMap” might be better suited for situations where a larger group comes together; or to energize first-time encounters.** Some participants thought that “if there wasn’t much to talk about it would probably be more useful” (S1). Others suggested “it would be more fun with more people” (S5) than in a one-on-one meal, e.g. “at a big family or friend get-together” (S1) Participants also noted they would be interested in playing with “PlaceMap” with people with whom they did not have a strong relationship, to create an opportunity for shared activity: “I think because that my partner and I are too familiar with each other, it felt a bit unnatural to use an additional app to facilitate conversations for us... Maybe it’s more useful for first date or at parties with new friends” (S3). Participants also thought that “the idea and learning more about other cultures is very interesting” (S6). In fact, they suggested “PlaceMap” would be much more fun “if there were people from different cultural backgrounds that might have been more interesting as well, because then we would actually know the tradition and be able to discuss it in more detail, besides the stuff that was on the app” (S4). Though that might be hard to control by design, there may be ways of connecting geographically dispersed people over apps like “PlaceMap”, e.g. through “a virtual shared space everyone could interact with each other by pinning a place and making their own food items based on the traditions, as well as sharing or selling their creation...” (S3).

**Text-to-speech voiceover can be highly distracting in settings where people often converse.** Participants felt distracted by the text-to-speech voiceover, e.g. “it detracts from

experience” (S5). Partly, that was because “the lady talking was not very natural” (S6); it was “very robotic sounding” (26), which “really detracted from the environment” (S5) and “made it impersonal” (S6). Another reason was that “phones would start taking at the same time. That was a bit much. One at a time would be better” (S1). Participants in (S7) proposed to get rid of the voiceover, as they “like it more if someone reads out the text [they] all need to know”.

**Existing operating systems might be limited when it comes to enabling communal phone experiences.** Another relevant finding from engaging with the “PlaceMap” prototype did not emerge from the user study per se, but from the prototyping phase. When trying to develop a fully functioning prototype of our UI design, we encountered several technical limitations derived from the very nature of smartphone operating systems. Especially with iOS, some of our novel design choices were hard to implement. On occasion, we had to work around those limitations in creative—yet questionable from the perspective of good practices in app development—ways. For example, the communal functionalities of “PlaceMap” were dependent on each mobile device simultaneously following the group’s progress and reporting back its individual status. If one of the phones either lost connection or had its app suspended by the operating system, the group’s cohesiveness would be fractured. We addressed this issue by allowing individual devices to momentarily separate from the group and reengage when possible. The consequence is that a specific user may feel excluded from the activity if their device is lagging behind. Furthermore, we originally intended to send a picture to users that exited the app, as part of the prompt for them to reconnect to the social situation, but the iOS operative system did not support embedded content in notifications. Instead, we had to settle on sending a simple text message, which compromised the intended experience. There were also situations where we simply could not find a way of implementing a functionality we had envisioned; for example, on iOS, the inability to determine if the “PlaceMap” software was in the foreground of a user’s device curtailed the

social features of the app. This constraint detracted from users' experience since they would either be reprimanded for their device's display turning off or be excluded from the recall component entirely. Those limitations brought about several problems, the most important being that we could not fully execute our vision of promoting communal play with the app. From our experience trying to transcend the individualistic nature of phones and phone apps, here I provide an additional design recommendation—not for designers and app developers themselves, but for the providers of the technical infrastructure that designers and developers will use to create new apps. If we want phones to have greater potential to support communal and embodied play activities, we may have to rethink some aspects of their infrastructure, which is currently eminently focused on individual activity. At a software level, it would be great to have more flexibility to observe the display's status (i.e. on, switched off by timeout, or switched off by power button) and active application when a user consents to it for this type of playful activity. At a hardware level, it would be interesting to be able to synchronize phones just by bringing them physically close, e.g. simulating a handshake. We acknowledge that introducing those novel properties would open a whole new set of issues to resolve, especially in terms of privacy and security, but we argue it is a worthy direction for technical exploration. Figuring out safe mechanisms for enabling new forms of communal experiences would enable designers to play with and stretch the boundaries of what it means to interact with one's phone, opening new and increasingly social avenues for these kinds of devices.

#### **5.6.5 Implications for design**

Building on the user study results above, I conclude that, for a design like “PlaceMap” to better support playful and social experiences around food, it should:

- Deliver actionable content. Rather than providing long, slow-consumption information, the system should provide clear and synthetic information that allows people to enact and play

with it. Especially when prompting people to playfully act together, the system should give clear instructions; not raw information for people to figure out, but clear step-to-step instructions that make embodied and improvisational participation easy. Designers should think of these as “guidelines for action” rather than “information”; additional data can be made available in case people decide they want to learn more.

- Curate content so it is relatable and only send it when it is contextually appropriate. people should be able to see how the information delivered by the system applies to their meal. The system should only intervene occasionally during the meal, when it is socially appropriate— unless people want to focus on it all the time, which will only happen in special cases. From people’s suggestions we conclude that fun facts stop being fun when they are not scarce, so it may be best to design experiences where information is delivered from time to time. That is especially true in one-on-one dining scenarios, where people may already have conversation topics coming up naturally. To make systems like “PlaceMap” more contextually appropriate, there is a great opportunity for AI to curate both the content and the rhythm of the experience, but further technical research is needed to achieve that in ways that are socially graceful.

- Take the form of a shared consumption device that is seamlessly integrates into the meal setting and acts like a device in the background that only intervenes whenever appropriate (see point above). Recent works in HCI have explored how to design these kinds of subtle objects for dining settings, e.g. the “SociaBowl” [155]. Phones should be relegated to very scoped parts of the experience rather than being used as core interfaces, e.g. to retrieve additional information whenever needed. Overall, the main interfaces should be shared, seamlessly integrated into the existing objects or space, and not require too much focus.

- If phones were to be used as the main interface, linking them as to afford a shared content consumption experience where all players see the same content is desirable. There should

also be a mechanism for the group to dissuade individualistic uses; rather than punishing or forbidding by default, the system should afford playful ways of dealing with socially disruptive behaviors. Yet, it is important to note that, according to the study, even if those two features are implemented some people may still find it distracting to use phones as the main interface.

- Avoid unnatural aesthetics that disrupt the social situation, e.g. a clumsy text-to-speech voice agent to deliver information. While audio was regarded as an interesting modality by participants, they generally did not enjoy the robotic voice delivering information as they felt it did not belong in or adapt well to the social situation.
- Ideally, target mealtime scenarios where more than 2 people are eating together, as in one-on-one scenarios it might disrupt conversations that naturally take place between diners.

## **5.7 Conclusion**

In this chapter, I described a co-design process where I used SPD to investigate the playful potential of day-to-day mealtime and engage diverse stakeholders to speculate how tech might respond to that potential. Because they stem from a series of co-design engagements, the outcomes of this process embody diverse ideas of how technology might support playful and socio-emotionally rich experiences around food—mine, my colleagues' who helped throughout the project, and the stakeholders' who participated as research subjects and co-design partners. These outcomes consolidate and extend existing ideas that have already been discussed in recent literature, e.g. they add nuance to research that suggests that using technology to deliver information can stimulate mealtime conversations [73][95][96][97], showing that this may only be true under certain conditions, and proposing design guidelines to achieve it. The results also propose new ideas that can help to further discussions in Playful HFI, e.g. the set of play-food potentials that emerged from the contextual research.

Overall, this project adds to the domain specific contribution of my thesis by providing design-oriented insights Playful HFI practitioners can leverage in their own work:

First, I provide a set of inspirational starting points for envisioning new play-food technology: a list of “play potentials” of mealtime that point designers towards food-related experiences that seem to be socio-emotionally rich (see Section 5.3). Those play potentials stem from a series of SPD inquiries where I explored existing playful food practices from different contexts and communities, and as a result highlight a breadth of ways in which people enjoy playing with food in group. I present those insights as inspirational design material that can provoke designers to ideate technology that supports social eating experiences that are contextually sound. Rather than attempting to provide a comprehensive view on the playful potential of mealtime technology, they begin to hint at exciting design opportunities in that space.

Second, I present a portfolio of speculative design ideas that concretize the above play potentials into tangible and relatable technology concepts. My “Speculative Play-Food Technology Futures catalog” (see Section 5.4) serves a dual purpose in this project: first, it allows me to illustrate how the findings from my play-chasing work can be translated into design ideas; second, it enabled me to further my conversations with stakeholders, empowering them to contribute concrete design ideas that built on the early contributions they made in the play-chasing phase. I present the portfolio as a collection of provocative ideas that can inspire novel designs in ways that extend existing works in Playful HFI. However half-baked and speculative (and, in some cases, technically questionable), the ideas embody design choices that respond to real people’s playful desires; as such, they bring forth valuable design knowledge. I hope they provoke and inspire designers to embrace increasingly playful and socio-emotionally sensitive approaches to mealtime tech design.

Third, I shared the insights from a series of co-design sessions where I experimented with, challenged, and creatively disrupted the early ideas in the catalog. Those insights raise important considerations designers should make when developing playful mealtime tech. They point designers' attention towards choices they will likely have to make, and present our participants' perspectives regarding those choices. In particular, the findings suggest that: (1) using technology to deliver fun facts can stimulate social eating experiences; (2) in those experiences, it might be better to provide diners with agency over the unfolding of events rather than letting the technology scaffold the experience; (3) providing tech with some kind of personality, as opposed to making it appear neutral, might help people to see it as a fun agent that is socially aware and can be interacted with; (4) tech should embrace the messy, embodied, and hands-on nature of eating, leveraging it to the benefit of a rich mealtime experience; and (5) designers should consider how the idiosyncrasies of each context might impact how people experience a playful and social meal, as food, play, and social interaction are heavily culturally loaded. I hope that these learnings help designers to attune the interaction mechanisms and underlying design qualities of their food-tech designs, in ways that the experiences afforded by the final outcomes are playful and socially stimulating.

Finally, I describe a fully functioning prototype of a playful mealtime technology inspired by the successive findings collected throughout this project, "PlaceMap", as well as a user study of that technology in use. Investigating people's experiences with and ideas of the prototype, I was able to further advance, challenge, and extend the design recommendations distilled from previous phases of the project. Even though not all design decisions behind the prototype led to a successful user experience, studying their impact allowed me to better understand what might be needed to design similar (and better) experiences in the future. The design implications presented in 5.6.5. make that knowledge actionable for other designers. The outcomes of the user study thus complement and add nuance to the above

three contributions of this project. I hope that the combination of the four outcomes of this work contribute to strengthening the body of design and research centered on proposing food technology futures that are increasingly playful and socio-emotionally rich.

While the findings from this project cannot be considered universally applicable, they respond to the views of people from diverse countries, from different socio-cultural backgrounds, and with different household configurations. I thus see them as a step forward towards imagining the future of playful mealtime technology from the bottom-up. I hope they provoke, inspire, and empower food-tech designers to embrace increasingly playful and socio-emotional approaches in their practice. Another limitation of this project lies in its scope: while some of the speculative ideas slightly tapped into food preparation (e.g. “Food Bingo”) or sourcing (e.g. “FoodLand”), my work mostly looked at mealtime as an experience of food consumption. Future work should build on my findings and broaden the scope of possible activities included in (or, at least, intimately connected to) mealtime, such as food preparation and disposal—to better understand and respond to the organic and multifaceted nature of mealtime practices.

## Chapter 6

### **CASE STUDY #2:**

# **THE PLAYFUL FUTURE OF SMART CITIES**

In this chapter, I present the second case study where I experimented with the Situated Play Design approach to investigate increasingly playful and contextually sensitive technology futures. In this project, I moved the focus from food practices to urban interactions: I explored how to rethink smart city innovation through the lens of play and playfulness, to ensure that future urban technology not only responds to techno-deterministic agendas but also to people's social, cultural, and emotional needs. Like in the previous case study, I had several collaborators: My advisor Katherine Isbister mentored me throughout the project. Jared Duval and Laura Bisbe helped throughout as well, contributing their expertise on accessibility and inclusion, and multimedia design, respectively. A team of research assistants participated in different parts of the process: Aurora Alparaz, Ivy Chen, Cameron Cooke, Binaisha Dastoor, Fyez Dean, Victor Dong, Rachel Haub, Kelsea Tadano, Amra Tilahun, and Jessalyn Wang. A designer from another institution also took part in some of the work involved in this case study: Adrià Altarriba. Although I spearheaded the project and the resulting publications, I acknowledge the importance of my colleagues' contribution.

This chapter is structured as follows: I begin by characterizing the design and research space of smart city innovation, positioning my work in alignment with existing efforts to reclaim the playful dimension of the urban space, i.e. the "playable city" movement [189]. Then, I give an overview of the methodology used throughout the design project—again, building on SPD as a point of departure. Following, I describe two play-chasing interventions through which I identified play potentials of urban spaces, i.e. playful things people already do in the public space and that might inspire the design increasingly playful urban futures. Building on those

play potentials, I present a “Catalog of Speculative Playful Urban Technology Ideas”: an annotated portfolio of smart city speculations that I created to instantiate and make tangible the play potentials from my earlier play-chasing work. Following, I describe a series of conversations I had with diverse stakeholders about the catalog, to see how the speculative ideas resonated with their own understandings of what playable cities should be and to refine the design directions emerging in this project. Finally, I discuss the learnings from the whole process and how they may help to advance the design research agenda of reclaiming the importance of socio-emotional wellbeing and fun in smart city innovation. Overall, this chapter (1) highlights promising avenues for looking at smart city innovation from a playful lens, as well as a series of design qualities that might support that move, and (2) extends Chapter 5 with additional examples of how to implement the Situated Play Design methodology.

## **6.1 Smart City innovation: beyond productivity**

With every generation, technology weaves its way more deeply into our lives; each time we must remake the choice to care about lived experience. Smart homes represented one such inflection point two decades ago: in response to the increasing presence of technology in our lives, the “Equator Project” [92] explored how not to lose sight of lived experience in the face of productivity-focused technology trends. Today, chiefly in the industry sector [122], smart cities present similar challenges: while promising increased competitiveness and quality of life [19], innovation in this space often favors techno-centric rhetoric that privileges agendas like increasing urban efficiency [18], optimizing infrastructure [170], or spurring economic activity [70]. Less attention is put to social intelligence, cultural artifacts, or environmental attributes [179]—all key components of socio-emotionally sustainable urban entanglements.

Alternative approaches to urban innovation exist, e.g. human-centered smart city design [17], democratic [181] and inclusive [206] urban planning, bottom-up urban innovation [54], or

sustainable smart city initiatives [220], among others. In this project, my aim was to contribute to a particular subset of this research space that approaches urban innovation through play and playfulness. Inspired by recent research in this space, e.g. [117][213][230][238], I built on the idea that cities should be far more than efficient; they should also be socially rewarding, culturally stimulating, and emotionally rich. My work highlights the importance of embracing those values if we want smart urban environments that are socio-emotionally sustainable. Fun and joy are not optional qualities when it comes to urban spaces—they are deeply necessary, as we know from Jane Jacobs' work [55] on what makes cities places to thrive. Cities are made up of moment-to-moment passing interactions between humans, and as such, they should cater to our social, emotional, and cultural needs. If cities fail to afford experiences that appeal to our emotions and need for connection, such as the ones I described in Chapter 3, they can become unwelcoming. Play can be a way of facilitating a move towards increasingly socio-emotionally sensitive urban configurations—a lens through which we can reclaim the playful, socio-cultural function of our cities and “resemantize” [238] them so they respond to our need for everyday play.

In HCI, a plethora of design and research work has explored the intersection of play and the city—a space that is often referred to as the “playable city” [189]. Within that space, different approaches exist. For example, location-based games use cities as physical landscapes within which virtual game worlds emerge. Whether in the form of research designs, e.g. [115], or commercial products, e.g. “Pokémon Go” [186], these games typically present alternate realities that take place outside of the player’s ordinary routine—gameful, entertainment-focused virtual worlds that hardly interface with the player’s ordinary urban practices.

Another set of playable city interventions are those that “gamefully” augment urban activity to support productive outcomes—what [238] calls “urban gamification”. Examples are a serious game to reduce energy consumption in smart buildings [104], or a gamified app to optimize

urban transportation [80]. Occasionally, those interventions are “playful” rather than “gameful” [160], e.g. a set of piano stairs to promote healthier habits in a public space [197]. Unlike location-based games, these designs strongly adapt the play experience to people’s ordinary, non-play activity. Yet, they are still characterized by their aim to support productive, goals rather than to enrich people’s experience of their city—an agenda that is central to my work.

Another type of playful urban tech are civic games that promote playful citizenship [117] and “shift the attention from smart cities to smart citizens” [75] by empowering them to playfully engage in city-making. Unlike location-based games, civic games relate strongly to people’s ordinary practices; unlike gamified apps or serious games, they are meant to enhance a city socio-culturally rather than productively, e.g. “Commons”, a game about filing claims about community needs by gathering evidence on streets [149]. It is inspiring how those games support rich socio-cultural engagements between citizens and their urban space.

Finally, we see playful urban designs in the form of technological invitations to engage in free-form urban play. These align with the design space of Technology for Situated and Emergent Play I characterized in Chapter 3, as they “support playful engagement that emerges interwoven with our everyday activities outside leisure and enrich these activities with socio-emotional value” [10]. For example, “SelfieCafe” fosters social interaction between community members by allowing them to take a selfie and share it on a large display [208]; “spread.gun” allows people to sabotage advertisement screens and “reclaim” them with custom messages [98]; “Urbanimals” [150] and “Hello Lamp Post” [194] allow people to play with urban infrastructure, let it be physically or verbally, in ways that do not bring about any productive gain. These works enable a “resemantization” of the urban space, allowing play to “infiltrate several contexts and spaces and propose new meanings, new constraints, new strategies, and new motivations” [238]. It is inspiring how they invite people to reframe ordinary spaces into arenas for exploration, creativity, community-building, and shared joy.

Despite their differences, those four types of playable urban technology share a focus on infusing aspects of people's urban endeavors with an element of playfulness—or, as [238] puts it, a “desire to rewrite the city, to reshape it, to engrave oneself in it, to renew it by resorting to the energy and the ability to motivate people that emanates from play”. Insofar as they propose experiences that (in different ways and to different extents) intertwine with people's ordinary urban activity, the playfulness they afford must be contextually meaningful. With this project, my aim was to contribute to the field of playable city design and research by uncovering and making designerly use of forms of play that are meaningful in the context of people's existing urban practices. I hope that my work inspires designers interested in strengthening the palette of design exemplars bridging play, technology, and urban design.

## **6.2 Method: speculating about the playful potential of urban tech**

I followed a similar structure to the previous case study. Taking Situated Play Design as a point of departure, I set out to explore how to realize the playful potential inherent in the urban space. I began with two play-chasing activities: First, I created a collection of social media posts featuring people's playful practices within the public space and examined it to identify recurrent forms of playful urban engagement (Section 6.3.1). Second, I turned to culture and traditions: I conducted an online multi-stakeholder co-design workshop where we explored street games and rituals to identify recurrent forms of urban play that might have inspirational value (6.3.2). The combination of those two interventions surfaced a list of play potentials of urban spaces (6.3.3), i.e. playful things people already do in the urban space and could arguably be useful building bricks for contextually sensitive smart city innovations.

Building on these play potentials, and drawing on my work in the previous case study, I produced a catalog of early speculative ideas to illustrate different ways in which the play potentials could give rise to increasingly playful smart city configurations (6.4). Like in the

other project, I then used the catalog as a multi-stakeholder engagement prop. In this case, due to the social distancing measures derived from the COVID-19 pandemic, I could not conduct remote co-design sessions where co-located participants could experience and creatively disrupt lo-fi prototypes of my ideas; asking people to come together and play in the street would have been, to say the least, unethical. Instead, I did a series of online interviews where I invited people from diverse countries, age groups, and professional and socio-cultural backgrounds to comment on the catalog ideas and share their understandings of what a playable city should be (6.5.1). I also conducted an online co-design workshop where I brought together a range of participants with diverse expertise relevant to urban innovation to reflect on the catalog and generate new ideas building on our list of play potentials (6.5.2). I report on the results of those multi-stakeholder engagements as advice designers may want to consider when designing playful technology for the urban space (6.5.3). I hope these play potentials, speculative ideas, and multi-stakeholder reflections inspire urban tech designers to take an increasingly playful and socio-emotionally sensitive approach in their work.

### **6.3 Chasing play potentials of urban spaces**

In this section I illustrate how I used two emergent SPD techniques to identify a series of play potentials of urban spaces. First, I produced and examined a collection of social media posts featuring people's ordinary playful engagements within the urban space. Then, I invited a diverse group of stakeholders to discuss the playfulness embedded in urban traditions from their cultural background. Building on the results of these interventions, I present a list of play potentials of urban spaces that build on real examples of the kinds of playful things people enjoy doing in their cities. I frame them as "generative" [112] knowledge that can inspire the design of future playful urban technology that supports, rather than disrupts, the kinds of ludic urban experiences people long for. I hope this chapter serves as an actionable demonstration of how SPD can be used to uncover the inherent playful potential of our cities.

### 6.3.1 Chasing play on social media

Social media is rife with posts that display everyday ways of being playful. They have value from a design perspective, as they feature mundane playful situations that can be used as starting points for ideation. Because of that, I thought social media might be an interesting play-chasing tool—a particularly useful one in the context of urban tech design, since much of social media content features events that take place in public spaces. In this project I used social media to inspire my playful design practice: I collected and examined existing social media content to identify instances of emergent playful behavior with the aim of helping my design team to sensitize to people’s existing playful practices in urban spaces.

For 5 weeks, I led a team of 6 designers who spent 3-5 hours a week looking for posts that displayed playful urban behaviors. We focused on Instagram and TikTok due to their leisure-focused and visual nature. We collected 383 posts on a shared spreadsheet, including: a link to the post, a short description, the publication date, and a note about its inspirational value (Figure 31). We used “inductive thematic analysis” [40] to explore our collection and identify recurrent play potentials. After 2 rounds of refining our themes, we discussed and contested each other’s codes to ensure intercoder reliability; we settled on a final set of codes and analyzed all the data accordingly. The result was a list of play potentials—i.e. ways in which people already engage playfully within the public space—each of them instantiated by several social media posts. We clustered the play potentials into 5 larger categories based on affinity. Here I describe those categories, their associated play potentials, and a set of posts that illustrate them<sup>9</sup>. Figure 32 shows some examples in a visual format.

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<sup>9</sup> Spreadsheet including all posts, our analysis, and the resulting play potentials: <https://bit.ly/39uOmqV>

ID	Link	Date posted	Post description	Out of the ordinary interactions w/ urban infrastructure					Out of the ordinary interactions between people			Creative disruptions		Stream exciting urban events					
				#1- Pose in front of a relevant object/landmark	#2- Pose next to an out of place object	#3- Pose in strange ways	#4- Explorative	#5- Silly performance	#6- Embodied performance	#7- Overcome challenges	#8- Collaborate/coordinate	#9- Leave messages for other people to find	#10- Communicate at a distance	#11- Massive celebration moments	#12- Banica to others	#13- Scare and/or prank	#14- Appropriates urban space artistically	#15- Customise how you appear in public	#16- Document fun things
1	<a href="https://www.instagram.com/p/B0yG7Jhr5C/">https://www.instagram.com/p/B0yG7Jhr5C/</a>	08/05/19	Someone's foot is covering the C on a label saying No						1										
2	<a href="https://www.instagram.com/p/B034MfchT-w/">https://www.instagram.com/p/B034MfchT-w/</a>	08/07/19	Two boys hung up a poster of them at McDonald's						1										
3	<a href="https://www.instagram.com/p/B034V5yByEX/">https://www.instagram.com/p/B034V5yByEX/</a>	08/07/19	Friends took a picture of themselves and put it in frame	1															
4	<a href="https://www.instagram.com/p/B1Qdm2LH/">https://www.instagram.com/p/B1Qdm2LH/</a>	08/17/19	Oven left on a street																
5	<a href="https://www.instagram.com/p/B1nXGbnM4T9/">https://www.instagram.com/p/B1nXGbnM4T9/</a>	08/27/19	Writing on the ground saying "lou lou was here"																
6	<a href="https://www.instagram.com/p/B1nqM8soJf/">https://www.instagram.com/p/B1nqM8soJf/</a>	08/27/19	A book of funny public signs																
7	<a href="https://www.instagram.com/p/BuPTXoAYm/">https://www.instagram.com/p/BuPTXoAYm/</a>	08/29/19	A machine that prints out short stories for people																
8	<a href="https://www.instagram.com/p/B1uqC_jpae5/">https://www.instagram.com/p/B1uqC_jpae5/</a>	08/29/19	Person pointing at a landscape and creating a horse						1		1								
9	<a href="https://www.instagram.com/p/B3dmh78l9S/">https://www.instagram.com/p/B3dmh78l9S/</a>	09/15/19	Balloon looking objects that are punchable																
10	<a href="https://www.instagram.com/p/B38KpzcRQm/">https://www.instagram.com/p/B38KpzcRQm/</a>	09/25/19	Cashier singing song with their machine						1										
11	<a href="https://www.instagram.com/p/B3BLyJlUvZ/">https://www.instagram.com/p/B3BLyJlUvZ/</a>	09/29/19	Yellow house with a sign that says it is a honeycomb																
12	<a href="https://www.instagram.com/p/B3ltxBxoktQ/">https://www.instagram.com/p/B3ltxBxoktQ/</a>	10/02/19	Two people surfing and high fiving																
13	<a href="https://www.instagram.com/p/B3lElnSINvK/">https://www.instagram.com/p/B3lElnSINvK/</a>	10/11/19	A building that lights up and lets people play tetris																
14	<a href="https://www.instagram.com/p/B3lUyJSHFG/">https://www.instagram.com/p/B3lUyJSHFG/</a>	10/11/19	Dolphin that is splashing people who do not want to be																
15	<a href="https://www.instagram.com/p/B4Xp5S5I5aX/">https://www.instagram.com/p/B4Xp5S5I5aX/</a>	10/30/19	Group of kids counting down the time at a cross walk						1		1								
16	<a href="https://www.instagram.com/p/CAx35FH0eX/">https://www.instagram.com/p/CAx35FH0eX/</a>	05/29/20	Man playing the drums at the back of a car (?) while vi						1		1								
17	<a href="https://www.instagram.com/p/CA0Ln48Iaw/">https://www.instagram.com/p/CA0Ln48Iaw/</a>	05/30/20	Woman doing yoga barefooted at the bottom of a large	1															
18	<a href="https://www.instagram.com/p/CAzNS9LJ2kx/">https://www.instagram.com/p/CAzNS9LJ2kx/</a>	05/30/20	Woman doing handstand splits on the middle of a bridg	1															
19	<a href="https://www.instagram.com/p/CA0gmVlDYox/">https://www.instagram.com/p/CA0gmVlDYox/</a>	05/30/20	Woman balancing on top of a rock structure at the top	1															
20	<a href="https://www.instagram.com/p/B-M56qauHUL/">https://www.instagram.com/p/B-M56qauHUL/</a>	05/26/20	Two kids lying on the ground where there are unicycl																

Figure 31. Screenshot of the first 20 datapoints of our dataset of social media posts featuring playful urban behavior.

**Out of the ordinary interactions with urban infrastructure** (287 posts). A recurrent theme in our collection was interacting with public infrastructure in out-of-the-ordinary ways. We saw five different play potentials that related to this category. First, we observed that sometimes people behave playfully when they (#1) “stop to interact with public infrastructure” (58 posts), e.g. by admiring a piece of art projected on the façade of a building (<https://bit.ly/3l5by2U>). We also observed that some people like to (#2) “perform in public in silly, unusual, or creative ways” (73), e.g. playing drums from the trunk of a moving car (<https://bit.ly/36rwBIX>). Next, we saw instances of people (#3) “using their bodies in synchrony with elements of the urban space” (80) through dance or any other sort of planned movement, e.g. a street performer dancing inside a metro car using the car’s infrastructure as a support (<https://bit.ly/34IS9UC>). Another play potential we identified has to do with (#4) “overcoming improvised physical challenges” (54), using urban infrastructure as the playground, e.g. people parkouring (<https://bit.ly/3l9fwl0>) or kids climbing on a fence and hanging onto it (<https://bit.ly/3n8oaZ7>). Last, we also saw posts in which people (#5) “collaborate to better the state of something or someone in the public space” (22), e.g. engaging with an art installation that encourages people to volunteer to take care of plants (<https://bit.ly/3ne8mnq>).

**Posing in urban spaces** (127 posts). Another recurrent theme in our collection was the act of posing in or around relevant public objects or spaces. We identified three play potentials under this theme. First, we saw people (#6) “posing in accordance with relevant objects or landmarks” (61), e.g. a man interacting in silly ways with a fountain as he is being recorded (<https://bit.ly/2ET02rV>) or a man mimicking a statue next to him (<https://bit.ly/2GdPi8q>). We also saw people (#7) “posing next to objects that are out of place” (20), e.g. people posing in front of objects that they sneakily placed (<https://bit.ly/3jqrCvM>). Finally, we saw people (#8) “posing in unconventional ways” (46), e.g. jumping off of a sculpture (<https://bit.ly/30sfGCe>) or risking falling from a tree by sitting on it for a photo (<https://bit.ly/2GjbcXK>).

**Streaming exciting things that take place in public spaces** (125 posts). Another important theme in our collection was the act of streaming exciting public events. Here the focus was not so much on the activity itself that was performed, but on the act of sharing it with others. We saw that kind of behavior manifest in different ways. First, we observed people (#9) “documenting exciting things they saw in the street” (74), e.g. doing a TikTok compilation of street art found in a particular location (<https://bit.ly/3cQncMh>). We also saw people (#10) “documenting elements of a public space to find alternative beauty in them” (19), making videos/photos of ordinary urban spaces in ways that showed them in a different way, e.g. a post where the author throws her phone up into tree blossoms while it is recording to produce a slow-motion video (<https://bit.ly/3cSff99>). Finally, we observed people (#11) “streaming self-imposed challenges” (32) so other people could witness them, e.g. a girl challenging herself to move between two points without touching the floor (<https://bit.ly/34cJMKU>).

**Creative disruptions of the public space** (81 posts). Another theme in our collection had to do with creatively disrupting public settings. A play potential under that umbrella is (#12) “appropriating the urban space artistically” (57), e.g. painting a face on a wall using a bush as the face’s hair (<https://bit.ly/2EUWKVh>), or turning an ugly architectural element into a funny

face with a doodle (<https://bit.ly/2Gnzwrk>). These posts show how artistic appropriations can both be carefully created or spontaneous and low effort. Another play potential based on a creative disruption of the public space involves (#13) “customizing the self” (24): changing how one appears in public to provoke others’ reactions. An example is a post where the authors customized their electric skateboards to look like a tiny police car or a dinosaur, thereby attracting other people’s attention (<https://bit.ly/33pSd6y>).

**Out of the ordinary interactions between people** (64 posts). Finally, the last recurrent form of playful urban interaction we observed in our collection of social media posts is the act of interacting with other people in ways that are out of the ordinary. We observed different kinds of interpersonal urban interactions with a playful potential. First, we saw people (#14) “leaving messages on public spaces “(21): finding creative ways of communicating with others who were not present at the time, whether that be through art (a doodle, a mural...) or text (a billboard with a joke, a name written somewhere...) for someone else to find. For example, a post that shows a message someone left on the pavement so that other pedestrians would read it (<https://bit.ly/33p0JTU>). Another form of out-of-the-ordinary interpersonal engagement is (#15) “communicating at a distance in somewhat silly ways” (17), e.g. a lady yelling a funny phrase out of her window and someone responding back (<https://bit.ly/3l6UeKN>) or people from a train waving at passersby they never met before (<https://bit.ly/3cWg68T>). Another play potential we identified had to do with (#16) “sharing celebratory moments” (4), e.g. an entire apartment complex gathering on their balconies to dance to music (<https://bit.ly/2Gb9Dv3>). We also saw playfulness emerge as a result of the act of (#17) “being nice to others” (8), e.g. a man saying good morning to strangers in the street (<https://bit.ly/34jlsHl>). Finally, another play potential resulted from quite the opposite; a fair share of posts featured (#18) “harmless pranks and jokes between strangers” (14), e.g. scaring people by pretending to accidentally topple boxes on them, knowing that the boxes are attached (<https://bit.ly/3ipvDPN>).

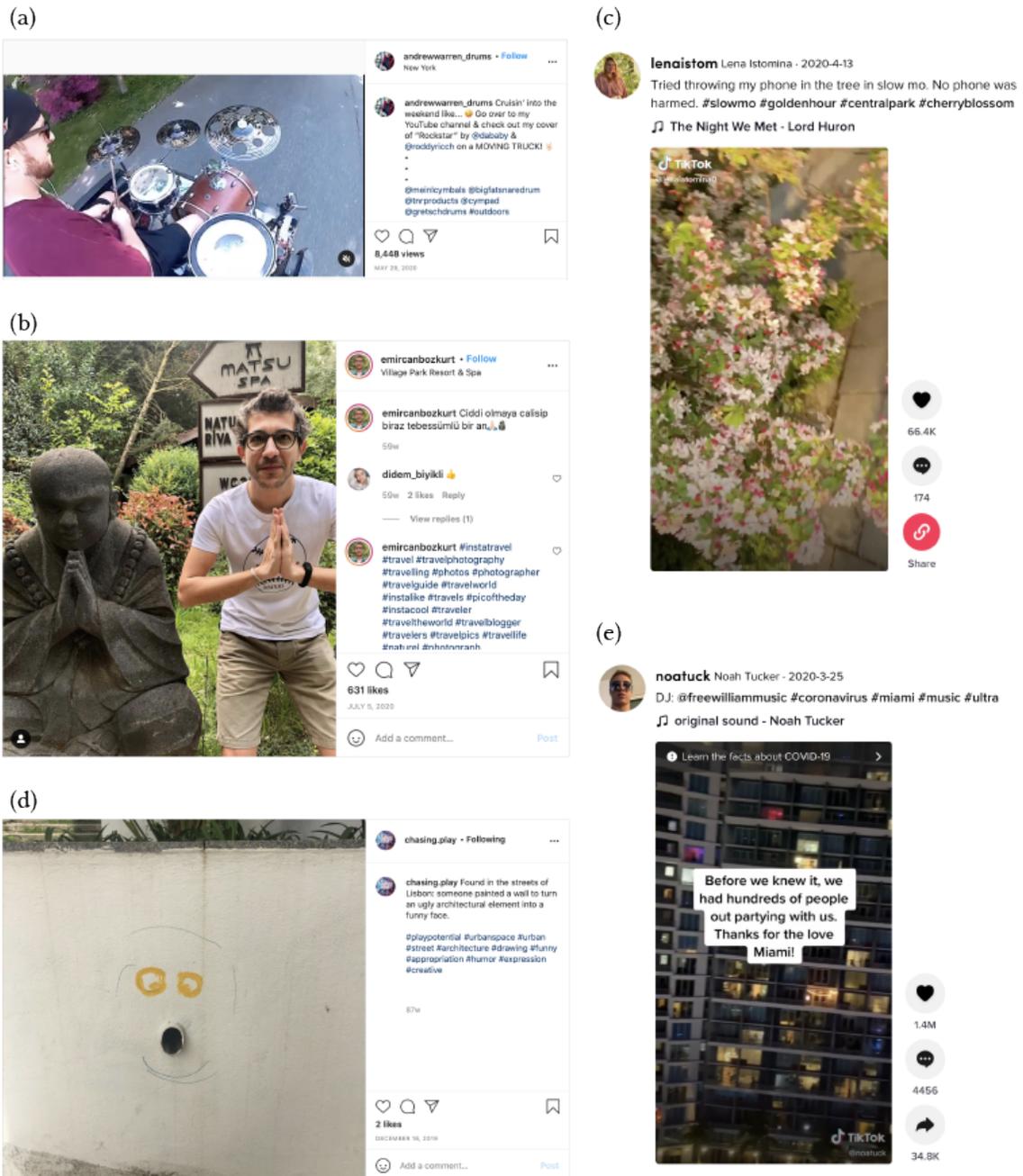


Figure 32. Examples of social media posts in our collection, representing each of the 5 larger categories we identified: (a) “Out of the ordinary behaviors within the urban space”: someone playing drums from the trunk of a moving car. (b) “Posing in urban spaces”: a man mimicking a statue next to him. (c) “Streaming exciting things that take place in the urban space”: someone throwing their phone up into tree blossoms while it is recording to produce a slow-motion video. (d) “Creative disruptions of the public space”: an ugly architectural element that is turned into a funny face with a doodle. (e) “Out of the ordinary interactions between people”: an entire apartment complex gathering on their balconies to dance to music.

### 6.3.2 Chasing play in culture and traditions

In the second play-chasing intervention, I turned to culture and traditions to identify play potentials that were embedded in cultural rituals and games practiced in the urban space. Inspired by the play and culture workshop I conducted in the previous case study (see 5.3.2 or [12]), I invited a diverse group of stakeholders to a 3-hour workshop where we discussed and examined a set of urban traditions to identify recurrent forms of urban playful activity that were meaningful to them. Due to social distancing measures related to the COVID-19 pandemic, the workshop took place online over Zoom and Miro. 13 people participated, including two facilitators. Participants had professional careers I thought were relevant to the themes of play and smart city innovation: two gamification consultants, three experts on traditional games, a game developer, an interaction designer, a communication designer, a philosopher, an architect, and a journalist who specialized in emergent tech. Before the workshop, I crafted a Miro collaboration environment to facilitate the conversations (Figure 33). I populated the board with playful urban traditions from my previous research and shared

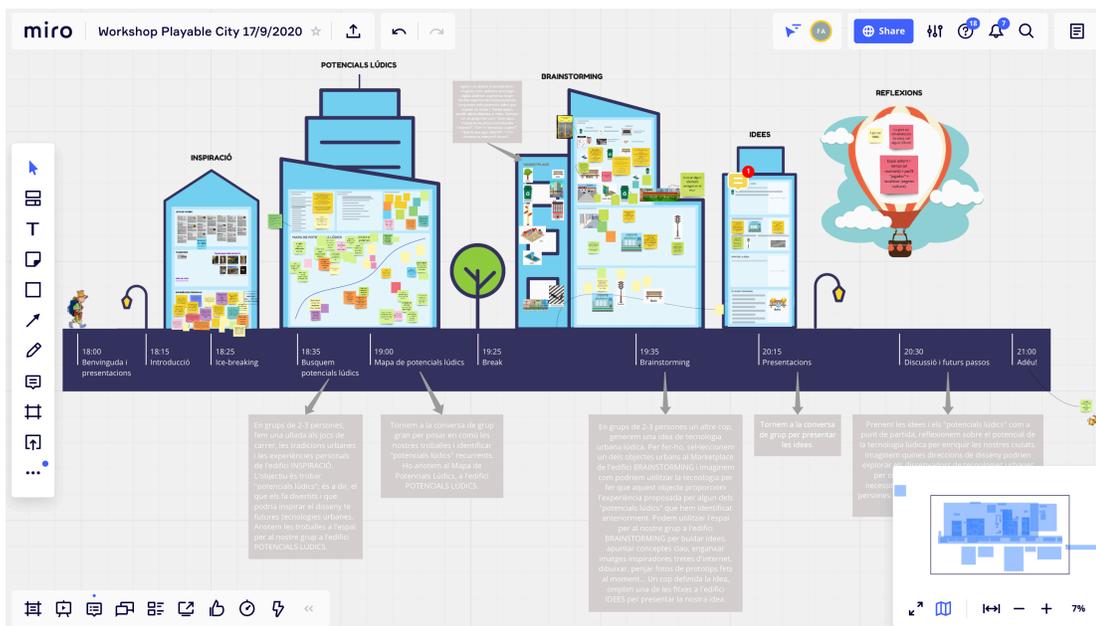


Figure 33. Screenshot of the Miro board we created for the workshop, taken after the event. It includes participants' contributions in the form of post-its, notes, and mock-ups.

it with participants a week before the workshop, so they could familiarize themselves with the traditions. I also invited participants to add new traditions to the collection, in the form of street games, urban rituals, or fun personal experiences they had lived in their cities.

At the workshop, participants used the Miro board to discuss and visualize their ideas. We began by examining the collection of urban games, rituals, and personal experiences to find recurrent forms of playful engagement we thought were interesting. Then, we clustered everyone's contributions into a shared map of play potentials that might inspire playful smart city innovations. Next, I invited participants to brainstorm how urban infrastructure (e.g. a bench or a light pole) might afford technology-mediated experiences inspired by one or more of these play potentials. To close, we built on the resulting speculative ideas to reflect on the relevance of the play potentials found during the workshop and, more broadly, of my situated and playful approach to smart city innovation. After the workshop, I analysed both the Miro board annotations<sup>10</sup> and the workshop recordings to synthesize people's ideas. The result was a list of 9 play potentials inspired by culture and traditions, each instantiated by at least one urban game, ritual, or personal experience. Here I report on those play potentials, using as a reference some of the traditions and participants' experiences that motivated them.

Some of the play potentials I identified had an element of discovery and exploration. For example, (#1) "being surprised by something unexpected that happens in the street". An example of this play potential is a Belgian tradition shared by one of our participants. One day, during a short stay he did in Belgium, the participant went out in the street and found that it was unusually crowded. People seemed more cheerful than usual. He eventually realized that it was the "Jenever Festeen", a festivity where the city's fountains temporarily

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<sup>10</sup> Miro board, including all contributions by workshop participants: [https://miro.com/app/board/o9J\\_klj3VPQ=/](https://miro.com/app/board/o9J_klj3VPQ=/)

pour gin instead of water. That brought about a great deal of surprise and excitement: our participant was able to momentarily experience the city in ways he never did before. Another play potential we found with a clear exploratory nature involves (#2) “discovering the invisible”—learning about those little, mundane things that constitute the cultural idiosyncrasy of a place, which are often not tangible and, as such, can be hard to identify. An example that illustrates this play potential is a playful activity one of our participants used to do when he was a child. When he, as a boy scout, went on a summer camp, the first thing they would do was a Gymkhana-like activity of exploring the town they visited. The activity involved getting familiar with the most popular parts of the town, meeting key members of the community (e.g. the baker or the mayor), or learning about the myths from that location. The same tradition was also used by participants to propose a slightly different play potential: (#3) “temporal decontextualization”, i.e. the idea of learning about what happened in a particular urban location in a different moment in time. In their conversations, participants realized there was something very interesting about being physically present in a location while learning about things that took place there in the past—both historically consequential events and mundane, ordinary stories of people who lived there. Finally, we identified a fourth play potential that had an element of exploration, in this case coupled with imagination and fantasy: (#4) “filling the gaps”. A participant shared a ritual their family used to practice anytime they visited an airport: guessing what the lives of others in the airport might be. Responding to that story, another participant talked about a similar ritual where their family played at guessing the life story of passersby in the street. We realized that there was something exciting about being surrounded by strangers and fantasizing about the intricate stories behind them.

A second theme we explored during the workshop was the idea of expressing oneself on, within, and through the public space. A play potential in this category involves (#5) “working on one’s socio-cultural belonging”, either by appropriating the urban space to turn it into a

place that feels like home, or conversely adjusting one's own appearance and behavior to adapt to the socio-cultural idiosyncrasy of a location. This play potential surfaced from a story shared by one of the participants: an urban hacking initiative he discovered on one of his trips where local citizens created several collaborative Spotify playlists and linked them to street sewers through QR codes, so that people could collaboratively curate and enjoy the playlist of that neighborhood. Participants also discussed experiences and traditions that involved (#6) "hacking the street": using the urban space as a blank canvas for creative expression, or a platform for creating interventions for other people (in particular, strangers) to experience. A clear example of this play potential is a contest that takes place in Gràcia, a neighborhood in Barcelona, every year: neighbors collaborate to decorate their streets in highly creative ways and compete with other streets to be recognized as the year's best decoration.

The third set of urban play potentials we identified in the workshop was primarily concerned with the social interactions that take place in urban spaces. First, we discussed the fun derived from (#7) "connecting with strangers": looking at other people as exciting "treasures" that can be discovered and explored, as some sort of social mystery that can be a source of excitement. An example of a tradition embodying this play potential is another boy scout's activity that is often practiced in Catalonia: when arriving to a new location, the adult leaders give children the challenge of finding key members of the local community and introducing the party to them. The challenge is that the leaders provide children with limited information about these individuals' location, appearance, or life story, which makes finding them a hard quest. Another play potential with a social component is the idea of daring people to (#8) "compete over (sometimes ridiculous) challenges": proposing (or having proposed to one) quick, spontaneous challenges to complete in competition with someone else. This play potential was inspired by a family ritual where a participant and his son often engaged in a competitive challenge of being the first to identify a 4-digit car license plate that adds up to

21. The last play potential that surfaced in the workshop was the idea of (#9) “completing self-imposed physical challenges” using the urban space as a playground, e.g. a participant’s story of stepping only on tiles of a specific color—an experience most of us shared.

### **6.3.3 An inspirational collection of play potentials of urban spaces**

After completing the two play-chasing activities above, I did a second round of analysis to combine the resulting sets of play potentials into a unified list. My analysis was led by two premises: First, I wanted to synthesize the findings into a shorter list of play potentials that was manageable and actionable for designers—one that would not be too long or complex to be used as starting point for ideation. Second, I wanted to surface those findings that could be most inspirational from a design perspective, to point designers towards how those contextually meaningful forms of playful urban engagement could guide design.

To do that, I clustered the play potentials by affinity, looking at the similarities between the play forms they highlighted, e.g. I combined the play potential #12 from the social media-based intervention (“appropriating the urban space artistically”) with play potential #6 from the workshop (“hacking the street”) into “hack the street”, as they were almost identical; or I decided to omit “stop to interact with public infrastructure” (social media-based intervention, play potential #1) because I thought it may not have as much inspirational value as other items on the list. To ensure that the combined list represented the results from the two play-chasing activities accurately, I invited researchers involved in both interventions to dispute it. The result is a list of 15 play potentials of urban spaces (Figure 34): playful things people already do (and seem to enjoy) in the public space. I present them as contextually grounded starting points for ideating playful urban technology. I suggest that they can inspire designers to envision technology-mediated playful urban experiences that intertwine well with and enrich the socio-emotional texture of our cities.

# PLAY POTENTIALS OF URBAN SPACES



## #1 Admire the urban space

It can be fun to find unexpected, surprising, hilarious, visually stimulating things in the street. Designers should think about how their interventions could capture people's attention and provide an experience of wonder.

Source: scraping social media



## #2 Stream exciting urban occurrences

People enjoy documenting interesting things they find around the city (e.g. beauty, action, surprises). Designers should think about how to allow people to document urban occurrences to share lived experiences and express themselves creatively.

Source: scraping social media



## #4 Fill the gaps

Fantasizing about things we know very little about can be fascinating and mind-absorbing. Designers should think about how their playful urban designs might help people to imagine and fantasize with the backstories of others surrounding them.

Source: play & culture workshop



## #6 Pose performatively

People enjoy posing in strange ways around landmarks, statues, or out-of-place objects. Designers should think about how to enable and encourage playful kinds of posing experiences that are fun for both those who pose and those around them.

Source: scraping social media



## #8 Customize the self

Some people also enjoy wearing attention-grabbing clothing, wearables, lights, and costumes. Designers should think about how to facilitate experiences where people can enrich their public appearance.

Source: scraping social media



## #10 Connect with strangers

Urban spaces are social connection arenas. There is something playful about looking at other passers-by as treasures to discover. Designers should think about how to prompt people to accidentally meet strangers and initiate new connections.

Source: scraping social media + play & culture workshop



## #12 Communicate at a distance

It is fun to connect with others who are visible but at a distance, knowing that it'll be a brief and light-weight interaction. Designers should think about how to afford distanced and time-bounded social experiences that are exciting and fun.

Source: scraping social media



## #14 Prank strangers

If done safely, it can be fun to prank strangers. Designers should think about how to facilitate light-weight forms of urban pranking that are harmless (physically, emotionally, socially) and fun for both the pranker and the pranked.

Source: scraping social media



## #3 Discover the invisible

It can be fun to explore the hidden cultural subtext that conforms the socio-cultural fabric of a city. Designers should think about how to enable and encourage people to discover tacit urban knowledge to become familiar with an environment.

Source: play & culture workshop



## #5 Temporal decontextualization

There is something exciting about learning about the real or imagined history of an urban space while physically present. Designers should think about how to enable people to share and learn the stories that took place in a city.

Source: play & culture workshop



## #7 Performative behaviors

Some people enjoy doing things that are noticeable (e.g. silly, creative, or otherwise remarkable). Designers should think of ways to augment urban spaces in ways that people feel safe to be performative for their own enjoyment and to amuse others.

Source: scraping social media



## #9 Hack the street

Streets can be a canvas for personal expression: to make art, share ideas, and communicate through messages. Designers should think about how to enable citizens to appropriate the urban space and use it to advance their creative/expressive agendas.

Source: scraping social media + and play & culture workshop



## #11 Asynchronous communication

There is an element of fun, mystery, and excitement in leaving messages on public spaces for other people to find. Designers should think about how to augment the urban space with technology that enables people to communicate asynchronously.

Source: scraping social media



## #13 Massive celebrations

There is something exhilarating in being part of a massive celebration. Designers should think about how to use technology to enable moments of collective celebration, bringing strangers momentarily together to cheer and share joy.

Source: scraping social media



## #15 Urban challenges

Some people enjoy self-imposed urban challenges, e.g. jumping on certain tiles, or crossing the street in <n seconds. Designers should think about how to afford small, spontaneous challenges that add a bit of spice to people's ordinary urban movements.

Source: scraping social media + play & culture workshop

Figure 34. The list of play potentials of urban spaces, identified through two play-chasing interventions: scraping social media and a play & culture workshop. A plain text version of the list can be accessed at: <https://bit.ly/fig3alt>

## 6.4 A catalog of speculative playful urban technology ideas

Building on the play-chasing results, my research assistants and I began to speculate about how urban technology could respond to the above play potentials. We began with a first round of ideation, done independently by 6 of us over two weeks, aimed at generating early ideas of technology-mediated urban experiences that embraced at least one of the play potentials. We produced 25 ideas, which we collected on a slideshow<sup>11</sup> and expanded at a subsequent brainstorming session. Next, two designers examined the collection of early ideas to identify recurrent themes. We discussed their findings in another meeting, where we settled on 7 emerging design directions that (1) we found interesting and (2) resonated with the findings from our play-chasing work. Then, we took two weeks to concretize each design direction into 1-2 urban technology design concepts, taking our collection of early ideas as a point of departure. We refined the resulting concepts at a final brainstorming meeting, discussing and extending each other's ideas. Throughout the process, we kept track of how the emerging ideas related to the play potentials from the play-chasing phase of the project<sup>12</sup>.

Inspired by the work I did in the other case study (see Section 5.4), we mocked up our early concepts up into a "Catalog of Speculative Playful Urban Technology Ideas"<sup>13</sup>. I frame it as an annotated portfolio [159] of speculative design ideas highlighting interesting and socio-emotionally desirable forms of technology-mediated urban play. Here I present the 7 design directions in the catalog, as well as the speculative technology ideas that illustrate them. For an optimal representation of the design ideas, I refer the reader to the full catalog.

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<sup>11</sup> A slideshow featuring our 25 early ideas: <http://bit.ly/earlyideas>

<sup>12</sup> A spreadsheet linking our ideas to the play potentials: <http://bit.ly/ideaspotentials>

<sup>13</sup> The full catalog: <http://bit.ly/playfulurbantechcatalog>



Figure 35. Mockups of “Augmented infrastructure for authoring urban experiences”. A: “Share-a-song”, a bench that allows people to send songs to other benches, or stick a song on it for people who will sit there later. B: “Moody Lights”, an app and set of multimedia light poles that allows citizens to craft magic ambiances for others.

“**Augmented infrastructure for authoring urban experiences**”, the first design direction, refers to urban infrastructure (e.g. light poles, a bench, a façade...) that is enhanced through digital technology (e.g. smart lighting, projectors, speakers...) and allows people to use a range of multimedia affordances to be creative and craft novel urban experiences—let it be for themselves or for others. The catalog features two design ideas that illustrate this design direction. One of them is “Share-a-song” (Figure 35A), an IoT device that adds “social sound system” to public benches. These benches allow people who sit on them to sync their phone, choose a song on Spotify, and either (a) send it to a nearby bench or (b) leave it on their bench to be enjoyed by the next person who sits there. One way or another, citizens can use their bench to craft short, ephemeral musical experiences for others around them, engaging in a rather unusual (i.e. asynchronous or physically distanced) interaction with people with whom they share the urban space (likely strangers). The other idea related to this design direction is “Moody lights” (Figure 35B) a set of streetlight poles equipped with a projector and an ambient sound system that allow citizens to craft surprising and somewhat magical experiences for other passersby. Through a phone app featuring a range of somewhat ambiguous adjectives (e.g. magical, surprising, funny, or colorful), people can target nearby light poles and curate the kind of ambiance they want to create; then, the light poles will begin to deliver the corresponding multi-sensory experience for those under their reach.

**“Parallel (in)visible realities”**, the second design direction, are augmented reality systems that enable citizens to experience fantastic realities that take place in parallel to the ordinary flow of urban life—and, as a result, to bond with others who also decide to experience them. Those parallel realities are only visible to those who use the system; that is meant to create a sense of community between users. An idea that aligns with this design direction is “A Mad Hatter’s world” (Figure 36), an “invisible” game that allows citizens to wear virtual hats that can only be seen through an AR app. People can create custom designs, choose from a set of pre-designed hats, or even steal someone else’s hat idea and keep it for themselves. At the core of this design is the idea of helping people to bond and feel connected with others, even with strangers, in a lightweight and non-invasive manner: by being part of a somewhat silly community of mad hatters accessible only through a dedicated app.



Figure 36. Mockup of “A Mad Hatter’s world”, an idea related to the design direction of “Parallel (in)visible realities”. Through a smartphone app, people can wear extravagant virtual hats and bond over that shared experience.

**“Spontaneous instigators of strange(r) connections”** are short, fast-paced invitations to social play placed in urban locations where people often wait or pass the time. They create situations that invite people to do unexpected things and initiate new connections as a result—even if ephemeral. The catalog features two ideas under this theme. First, “Dancing the light” (Figure 37A): a game augmenting pedestrians’ experience of waiting at a traffic light. When the light is red, a song plays on a speaker and a screen invites people to dance. The more people dance, the sooner the light will turn green. This idea hopes to encourage people to let go and submit to a somewhat silly ephemeral activity that will likely contribute to shared laughter and fun. This idea was inspired by existing designs that playfully repurpose a city’s traffic lights, e.g. “StreetPong” [91]; it extends them by enabling people to play using their body and the physical space rather than through a screen. The second design idea under this design direction is “Ready, steady, cross!” (Figure 37B): a short and fast-paced game that invites pedestrians waiting at both sides of a traffic light to compete over who will get to the other side first. When the light turns green, the race starts: the first side all whose members finish crossing will be the winner. Upon arrival, the winning team will be received with applause and a victory tune; the losing team will be “booed” to signal their loss. This design is meant to instill a sense of fellowship in strangers who happen to be at the same side of a crosswalk, and to help them to momentarily bond over the celebration of a win (or to playfully mourn a loss) in a race against people on the other side of the street.



Figure 37. Mockups of ideas related to the design direction of “Spontaneous instigators of stranger(s) connections”. A: “Dancing the light”, an augmented traffic light that invites pedestrians on both sides of a crosswalk to let go and dance to a shared tune and rewards them by shortening the wait time based on their performance. B: “Ready, steady, cross!”, a gameful traffic light that challenges people to cross the street first when it turns green.



Figure 38. Mockups of ideas related to the design direction of “Large scale urban toys”. A: “Building Art”, which turns a building’s facade into a giant canvas for collective artistic expression. B: “The Selfie Photoshoot”: a hotspot for taking challenging, hilarious photos in front of touristic landmarks.

“**Large scale urban toys**”, the fourth design direction, are interactive installations without a purpose other than allowing people to experiment with them in a lightweight, open-ended, momentary way. The catalog includes two design ideas under this theme. One of them is “Building art” (Figure 38A), which equips a building’s facade with LEDs whose color can be changed by citizens through an app. Once a day, the facade opens for some minutes so people can create a new composition. They can gather in front of it and paint 20 pixels each. The resulting piece of ephemeral collective art will be displayed until the canvas resets the next day. The other design idea under this theme is “The Selfie Photoshoot” (Figure 38B), a hotspot for taking pictures in front of touristic landmarks. A screen, located in front of the landmark, suggests a random pose, and initiates a countdown. Then, people are challenged to rush in front of the landmark and make the suggested pose before the countdown ends. At that point, the system will take a photo and measure the quality of people’s performance.

“**Portals of imagination**” are technologies that afford experiences of fantasy, imagination, and wonder. They provide citizens with an ambiguous and deliberately incomplete story to invite them to fantasize and fill the gaps. Two ideas in the catalog exemplify this design direction. One of them is “Silhouettes” (Figure 39A), an AR app that allows citizens to see the silhouettes of people who were in that same space before, along with the system’s guess of the silhouettes’ emotional state. Silhouettes allows citizens to fantasize about what happened

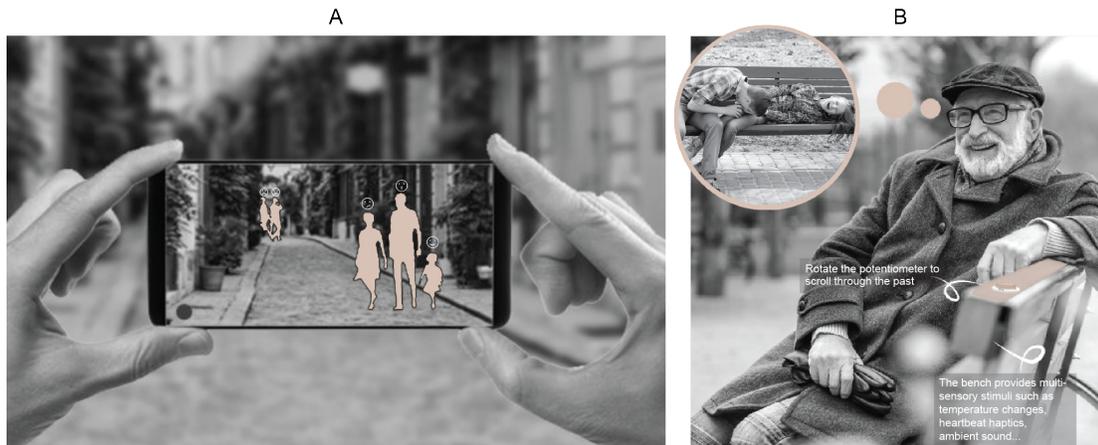


Figure 39. Mockups of ideas related to the design direction of “Portals of imagination”. A: “Silhouettes”, an AR app that allows people to see the anonymous silhouettes of others who passed by where they currently are, and to build on that ambiguous and incomplete information to fantasize with the life stories of those silhouettes. B: the “Sensorial memory bench”, a bench that stores unidentifiable information about the actions of people who sat there and communicates it to future users through ambiguous multi-sensory stimuli.

earlier in the very space they are inhabiting and share their guesses as comments to gossip with others. The second idea under this theme is the “Sensorial Memory Bench” (Figure 39B), which invites people who sit on it to fantasize about the lives of others who sat there before. When someone sits on the bench, the mood and tone of the situation is recorded. That information is then delivered to others who sit on that same bench through ambiguous multi-sensory stimuli (e.g. temperature, heartbeat-like haptics, ambient sounds...).

“**Local lore modules**” use technology to deliver local knowledge to visitors or newcomers—that is, information that is locally-produced and goes beyond the mainstream, e.g. stories about the locals, about the fauna and the flora, or tips about the idiosyncrasies of the place. Locals can appropriate the system and populate it with the content of their creation, which will be delivered to visitors to enable them to discover the place genuinely. The catalog features two design ideas under this theme. One of them is the “Scavenger Hunt Plaques” (Figure

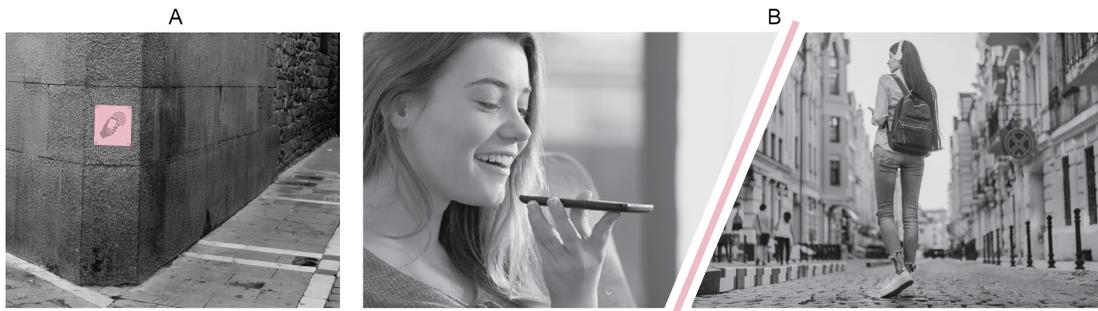


Figure 40. Mockups of “Local lore modules”. A: the “Scavenger hunt plaques”, which can be populated with local information by citizens so that visitors and newcomers can get to know a place beyond the surface. B: “Local whispers”, an app that allows locals of a city to store sound messages explaining stories about specific locations of the city, which visitors can then use to experience the city through the stories explained by locals.

40A), which can be placed anywhere within a city or neighborhood. Locals can populate the plaques with information relevant to their location: a thing they experienced in that place, a story that is not commonly known... Visitors can scan the plaques and discover those things that are only known by locals and learn stories they would not otherwise have access to. The other idea under this direction, “Local Whispers” (Figure 40B), follows a similar principle but instantiates it through a different modality. Through a phone app, locals can record audio messages and link them to a specific location within their city, e.g. to describe a place they love and why, tell stories that happened to them in that place, or share local knowledge they would like visitors to find. Then, the app allows visitors to enter a keyword (e.g. “romantic”) that will be used to create a sightseeing route for them: they will be guided, from audio message to audio message, to explore the city through the whispers of its citizens.

“**Shared canvases for collective grandeur**”, the last design direction, are interactive installations that reflect the socio-emotional state of a city as an emergent multimedia spectacle. The catalog includes two ideas under this theme. One of them is the “Fountain of whispers” (Figure 41A), a water fountain that reacts to the emotions of those surrounding it. Once a day, through a phone app, people can record a voice memo about their mood, or about something that happened to them, and send it to the fountain. The fountain will use the data to reflect the city’s mood by changing the water flow dynamics, raising or lowering the

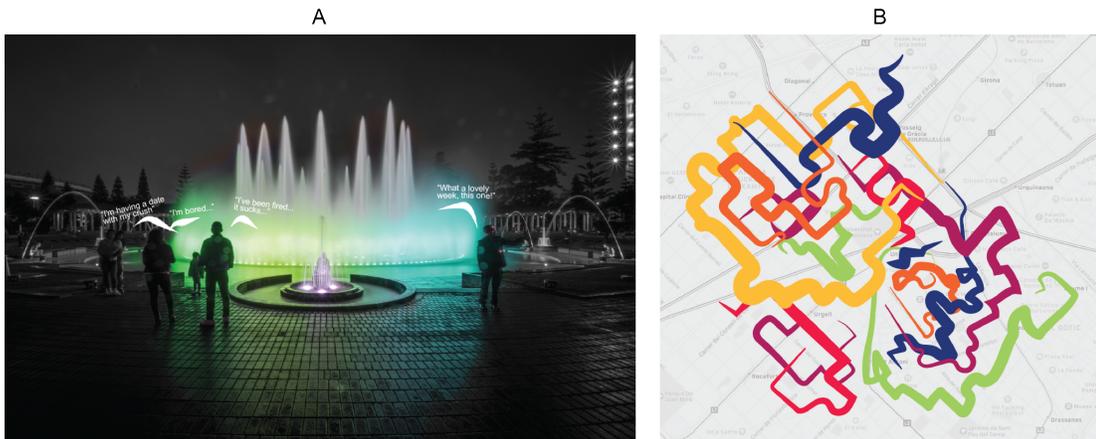


Figure 41. Mockups of ideas related to the design direction of “Shared canvases for collective grandeur”. A: the “Fountain of whispers”, which creates a multi-sensory spectacle that reflects a city’s emotional state. B: “VanGo”, an app that creates a piece of abstract art based on the movements of citizens within a specific part of a city.

temperature of the water, modifying the color of the lights illuminating the water, or playing ambient sounds. The last idea in our catalog is “VanGo” (Figure 41B), an artsy location tracking system that leaves a digital trail behind people as they move around an urban area. Everyone’s trails in that area can be seen through a phone, though there is no identifying information. Each participant can customize their own trail as they like. By moving within the area, citizens create a massive, constantly evolving, and ephemeral piece of art.

## 6.5 Multi-stakeholder engagement with the speculative catalog

Once the “Catalog of Speculative Playful Urban Technology Ideas” was ready, I set out to explore multi-stakeholder perspectives about it. While the ideas in the catalog responded to play potentials observed in the ordinary practices of stakeholders—and, hence, they could be considered a reflection of diverse understandings of the qualities of urban play—I wanted to further investigate how the designerly use we made of those play potentials resonated with the ideas of diverse citizens. Inspired by my work in the previous case study, my initial plan was to conduct a series of co-design sessions in-the-wild, inviting people to playtest half-baked prototypes of the early technology concepts at a range of urban locations, and using those experiences as starting points for further collective ideation. However, in this case it

was not possible to conduct such kinds of in the wild engagements. The issues derived from the COVID-19 pandemic made it both unsafe and unethical to engage people in co-located play in the street. I considered the idea of conducting playtests in other, less naturalistic settings (e.g. in the lab, or at people's homes), but discarded that because any relationship with context would be lost. After examining possible ways of moving forward, I decided to structure this phase of the project as a combination of two activities, described below.

First, my research assistants and I conducted a series of multi-stakeholder interviews where people had a close look at our catalog, commented on the ideas, and shared their thoughts on whether cities should be more playful and why, and how technology might contribute to that agenda. To recruit participants, we followed a similar process as with the other case study: we shared some of our ideas on social media, inviting people to see the full catalog and participate in a lightweight conversation about it. We did 12 interviews, ranging from 30 to 60 minutes long depending on how much participants wanted to share; some were done individually while others were done in group, adding up to 21 participants. 17 additional participants shared their thoughts through informal responses to our social media prompts but did not want to be interviewed. We recorded the interviews on audio and transcribed them in an anonymous format; people's spontaneous responses on social media were anonymized and stored as well. We then analyzed the data using "inductive thematic analysis" [40]: each of us looked at the data from the participants we engaged, which was then validated by someone else. Then, I performed a second-wave analysis to bring all the findings together.

The second intervention was a 2-hour multi-stakeholder co-design workshop where I invited 8 academics and practitioners with expertise relevant to smart city innovation to explore their understandings of what a playful smart city should be. The workshop took place online on Miro and Zoom; two colleagues from other institutions helped in the organization. Before the workshop, we invited participants to have a look at the catalog and familiarize themselves



Figure 42. Screenshot of the Miro board featuring participants' comments and votes to some of the catalog ideas.

with our speculative ideas. At the workshop, we began by inviting people to comment on our ideas and playfully signal which ones they liked the most and least using heart and poop tokens (Figure 42). Then, in groups, they created new ideas based on the play potentials from our prior play-chasing work. Finally, we reflected on the value of those play potentials, and discussed how they could be used to inspire increasingly socio-emotionally sensitive urban futures (Figure 43). To analyze the workshop outcomes, I used “inductive thematic analysis” [40] again, looking at both the transcription of participants’ conversations, the notes they left on the Miro board<sup>14</sup>, and the ideas they produced.

The combination of the interviews with average citizens and the workshop with expert urban innovators allowed me to further explore the value of my early, speculative design ideas—and most importantly, their underlying design qualities and the play potentials that motivated them—from a broad range of perspectives. I could get an understanding of what both expert urban innovators and average citizens thought about the idea of using technology to afford

<sup>14</sup> Miro board with all the contributions made by participants: [https://miro.com/app/board/o9J\\_IRMG000=](https://miro.com/app/board/o9J_IRMG000=/)

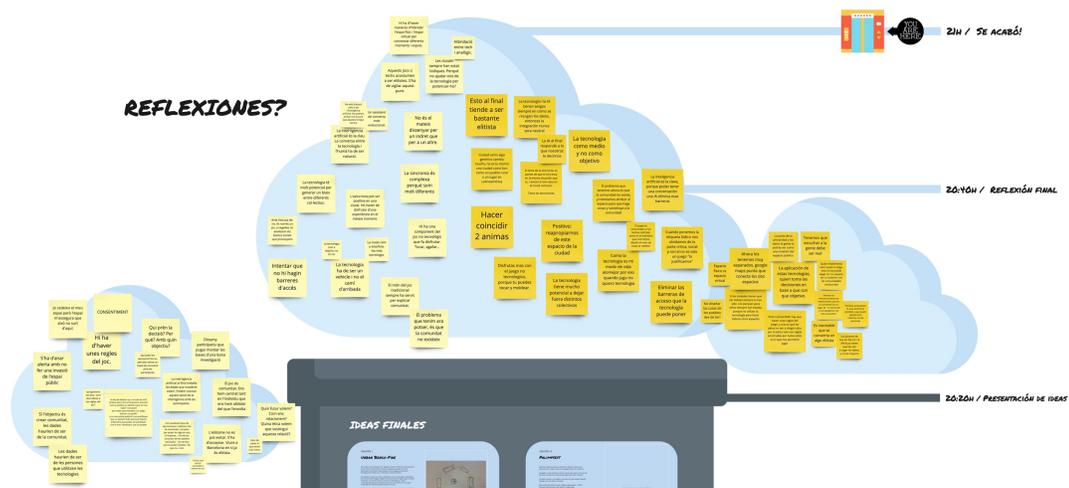


Figure 43. Screenshot of the Miro board featuring the digital post-its participants used to store the most relevant insights from the final workshop discussion.

playful engagement within the city, and what that configuration should look like to really turn cities into places where people can thrive socially and emotionally. After completing the two activities, I did one last round of analysis to bring together the outcomes of both interventions with a focus on highlighting the findings that were most relevant from a design perspective. I shared my analysis with researchers involved in both interventions so they could challenge and refine it, to ensure the outcomes accurately represented the most relevant insights from both activities. In the next paragraphs I present these results, which I frame as considerations urban innovators may want to make when designing playful smart city infrastructure that is meant to have a positive impact on people’s socio-emotional wellbeing. I use the convention P to refer to participants in the study, e.g. P1 means participant 1.

**Designing playful technology can enrich our urban spaces.** Many participants saw the value of transcending utilitarianism in urban innovation and enriching urban areas by adding social focal points of play citizens could gather around. As described in 5.1, much of the technology currently being developed under the smart city archetype is fundamentally designed to improve productivity, not necessarily to improve the socio-emotional texture of

people's engagement with the public space. Interviewees responded enthusiastically to the idea of playful urban technology, arguing that "there is an absolutely huge amount of potential there" [P4], and that "I love the idea of making the cities more playful" [P20]. They also resonated with the concept of utilizing technology as a way of realigning smart city technology to be more play-focused. Some argued that "technology is already embedded in our cities anyway, so it might as well make our cities more fun" [P20], while others highlighted specific affordances of digital technology that would be valuable to enable interesting forms of urban play: "[it] facilitates a lot of stuff and allows us to visualize things in easier and more interesting ways, in ways that change over time." [P2]. Participants also noted that designing for urban play precedes technology design, e.g. "architecture always had these decorative elements to it, which changed over the years depending on styles and aesthetics. [...] Like, you don't just build it. It also has a symbolic meaning and an art meaning and whatever" [P4]. They also noted that "the way in which [those technologies are] executed might be quite important" [P8] and that we have to take the novelty effect into account: "Some things might have sort of a novelty effect. Once or twice it would be cool, but constantly would probably be boring. Unless it changes..." [P4].

**Playful urban technology can and should act as a social catalyst.** Participants not only saw value in the technologies showcased in the catalog as promoters of playful activity, but also as gathering places that connect people. According to them, the main potential of the kinds of technologies featured in the catalog is that they can create new relationships between people: "One of the things that I really like is how a lot of examples work with connecting strangers, or like working together and then that togetherness.. That's something that I find really valuable" [P29]. In particular, P4 sees the notion of the familiar stranger as an opportunity to explore through playful urban tech. They think there is a lot of potential in making strangers feel connected without necessarily having to interact directly or in a

sustained manner: “There’s this notion of the familiar stranger: people you go on the same subway or whatever, so you recognize the guy because you’re always with him...

Sometimes you just see them, sometimes you will actually see them have little chats on the subway and then they go their way [...]”.

**Appropriation, collective creativity, and expression are important.** Participants seemed to gravitate towards ideas that allowed people to have some creative input to their urban space, as well as form bonds with each other. “Incorporating a kind of shared participation” [P21] and creating a space “where people can change and adapt things” [P7] were two key design choices that clearly struck chords with the participants. With the rise of the modern city structure, people might have lost opportunities for modulating their environment to better suit their needs. Customizable urban technologies, if implemented, could serve to meet this need of the populace which has gone unmet for quite a long time. However, for those interventions to be playful, it would be important to avoid malicious uses: “With a few of these ideas, I felt like my initial reaction was: oh, malicious actors would love things like this” [P22].

**There can be tensions between play and the city’s functioning.** Though they generally appreciated the idea of introducing playful technology in the urban space, participants were concerned about the potential negative effects of the technology. Concerns were raised in the realms of privacy, malicious activity, and safety. According to participants, some of the ideas in our catalog could compromise pragmatic uses of key infrastructure within a given city, e.g. “if you start messing up with the traffic lights, you can really bring a city to disaster by creating havoc all over the place” [P4]. To avoid such tensions, participants proposed to design tech that does not affect mundane urban activities that might be sensitive in terms of safety, such as driving or crossing a street: “Things that are not directly affecting an individual, but a group... [to not be] distracting to people who are driving or something” [P21]. Because of those tensions, P29 argued it’s inevitable that smart city innovation moves towards

efficiency, and suggested that we should embrace it “I think like the city is gonna go towards efficiency, because that's what the city council is gonna pay for. So I think you should think about efficiency” [P29].

**Consent is key to avoid a dictatorship of playfulness.** Participants also talked extensively about the notion of consent, noting that it is only natural that people often do not want to play and “something stops being fun when someone doesn't want to” [P29]. Much of the time a citizen is in the public sphere, they are pursuing a time-constrained task, and they may not want to engage in leisurely activities. Their right to not engage should be respected: “Imagine that I have to go from point A to B, and that I have to cross some of those traffic lights... and that I just don't feel like dancing. Or I'm reading my book on the metro, and around me there are playful things happening that I don't feel like engaging in. How can we avoid this?” [P2]. According to participants, playful tech must introduce itself as an invitation, not as an imposition: “You need to be able to have this freedom of play, you need to be invited and accept the invitation” [P29]. Participants highlighted some specific qualities playful urban technology should always have: First, it should be voluntary and opt-in, as opposed to opt-out: “I think that I'm more inclined towards the designs that incorporate something where, like a group of friends walk up and say, hey, let's try this, as opposed to just involving strangers that might not consent to it. Because if they want to, that's fine. But also you don't want those other people to feel ostracized for not participating” [24]. Second, participants suggested that people should have a clear mechanism for signaling if they want to play or not: “You need to have a way to signal that I want to participate in this. [...] Something I think applies to all the ideas is that you need to be able to initiate it, if you want to play” [P29]. A participant noted that giving explicit consent might be at odds with the idea of playful tech that surprises people. They proposed exploring mechanisms for surprising passersby in ways that are playful but not too disruptive, as an invitation to decide to engage in a playful experience or

not: “You have surprise as a concept that you're trying to occasionally elicit. And that is a nice thing to elicit, but it's difficult to consent to being surprised” [P21]. Participants also noted that people who do not want to play might affect the experience of those who do, which might be a mood breaker: “what if I just don't want to play and by not playing I'm actually influencing the experience of the people who want to play? We should avoid this” [P29]. Conversely, those people might feel pushed to play simply because others are, because of social pressure: “What if someone around them doesn't want to dance, and those who do push them to try? It could be uncomfortable, a bit too much”. Space for both playing and not playing, and clear mechanisms for signaling one's position, should be incorporated, “because the fact that some people love dancing doesn't mean everyone wants to dance all the time. No one should feel forced to participate” [P2].

**Privacy: “I'll let you play with my data only if I want to”.** Privacy was also a major concern and was discussed extensively by participants. Many felt that many of the ideas could potentially go against people's right to privacy: “I have issues with some of [the ideas], concerns about freedom, privacy, and usefulness” [P29]. Many participants seemed to oppose automatic data collection even in those cases where the data collected was non-identifiable, as it could potentially be traced back to the user by mapping it out with other data. When asked about the possibility of designing playful infrastructure people should only use if they accept the “pact to play”, a participant raised concerns in terms of inclusivity. They suggested it would not be ethical to deny the use of critical urban infrastructure to those who do not want to share their data, e.g. people not being able to use a bench because they know it tracks data to deliver a playful experience: “that's problematic in terms of policy, because you are excluding (a significant) population” [P29]. While in the minority, some participants were not too concerned with data privacy, as they saw it like a day-to-day part of city life. They thought it would be OK to play with people's data as long as it is done in an ethical

manner, and that efforts should be put to educating people about what the dangers of sharing data are and are not: “The whole notion of privacy is a modern concept. A lot of the big concerns people have with cities is that these ingrained notions that they've been fixing... ‘Oh, this is part of city life. And the part that I like about the city is nobody knows me and I can disappear and, and all of this stuff” [P4].

**Inclusiveness is paramount.** Inclusiveness was also considered an important design quality in any technology that inhabits the urban space: “a lot of things need to be taken into account, like accessibility, for example for populations with disabilities. Also languages, though in the case of dancing it may not be that important” [P1].

**Format: existing infrastructure, phones or new developments?** Participants also discussed the different formats and interfaces playful urban technology could have, and generally gravitated towards tangible and embodied interactions with interfaces embedded in existing urban infrastructure: “there's obviously lots of existing infrastructure that one can harness like lamps and stuff and then all the phones...” [P4]. Many also suggested to transcend interactions based on small individual screens: “With phones, it's like, I'm interacting with whomever is right next to me [...] But with larger screens it's like, ‘this thing exists and if we wanna cross we have to dance, dude, so let's do it'. This is great, I thought it's fantastic” [P2]. A lot of them agreed that the problem with individual screens might be when they focus people's attention on the screen, rather than the urban space and/or the other citizens, “For example, in this one [refers to building art], there's a screen; but it focuses your attention on something bigger and very visual, something that's shared among everyone. Instead, with Silhouettes, my attention is purely focused on my screen” [P1].

## 6.6 Conclusion

As this chapter illustrates, SPD can be a useful approach to envision playful tech that enriches people's interactions with(in) their city in ways that enable [238]'s aforementioned "resemantization" of the urban space; it focuses designers' attention on playful experiences people already enjoy in a particular context—ones that are likely meaningful to them and that, as such, may have inspirational value. By chasing play potentials in the urban space, we can uncover play forms that people already find meaningful and enjoyable. Those play potentials can then be used as starting points to inspire urban technology design, leading to ideas that align with playful practices citizens feel excited about. Such an approach can help designers focus ideation on types of playful experiences that resonate with a city's socio-cultural fabric and thereby contribute to realizing (rather than disrupting) the city's inherent playful potential.

The work done in this project contributes to an ongoing shift in values behind smart city innovation—arguably, a necessary one. I present it as inspiration for designers interested in developing urban technology that contributes to shaping public spaces where individuals and communities can flourish—productively, yes, but also socially, emotionally, and culturally. To that end, in this chapter I presented a three-fold contribution: First, the play-chasing phase of the project allowed me to uncover a series of playful practices people already do and enjoy in urban spaces. I frame them as play potentials that can serve as early inspirations for the design of technologies that afford contextually meaningful forms of urban play; they can provoke designers to open a new conceptual space in ways that their designs better respond to playful and social practices citizens long for. Second, the "Catalog of Speculative Playful Urban Technology Ideas" provides a set of half-baked design concepts that illustrate how the above play potentials can be used to guide technology design—see Figure 44 for a synthesis of the relationship between the ideas and the play potentials. As such, it can inspire designers at the early stages of their work, focusing them on affording types of urban

Design directions	Design ideas	Play potentials														
		#1 - Adminic the urban space	#2 - Stream exciting urban occurrences	#3 - Discover the invisible	#4 - Fill the gaps	#5 - Temporal decontextualization	#6 - Pose performative behaviors	#7 - Customize the self	#8 - Hack the street	#9 - Connect with strangers	#10 - Asynchronous communication a distance	#11 - Communicate at celebrations	#12 - Praise strangers	#13 - Urban challenges		
Augmented infrastructure for authoring urban experiences	Share-a-song															
	Moody lights															
Parallel (in)visible realities	A Mad Hatter's world															
	Ready, steady, cross!															
Spontaneous instigators of strange(r) connections	Dancing the lights															
	Building art															
Large-scale urban toys	The selfie photoshoot															
	Sensorial memory bench															
Portals of imagination	Silhouettes															
	Scavenger hunt plaques															
Local lore modules	Local whispers															
	VanGo															
Shared canvases for collective grandeur	Fountain of whispers															

Figure 44. Summary of ideas (and underlying design directions) included in the Catalog of Speculative Playful Urban Technology Ideas, linked to the play potentials they respond to. An accessible version of the table, including the 13 catalog ideas and the early collection of 25 ideas, can be accessed at: <http://bit.ly/table1alt>

experiences that are socially, emotionally, and culturally rich. Finally, the outcomes of the multi-stakeholder discussions about the catalog serve as critical, reflexive annotations to the play potentials and speculative ideas. They suggest how these kinds of interventions should and should not be built to support and mediate rich forms of emergent urban play.

I hope these contributions stimulate smart city innovations that transcend techno-solutionism. The ideas I presented respond to urban experiences people seem to long for, though they are hardly embraced in commercial smart city implementations. However speculative, the combination of these ideas and the multi-stakeholder reflections about them can help designers to be mindful of playful and social practices people already enjoy within their city—in ways that they can support (rather than disrupt) the playful potential inherent in an urban space. Importantly, these insights are: “bottom-up” (i.e. they respond to existing urban practices of average citizens) and “socio-emotionally focused” (i.e. they center on supporting rich, delightful urban experiences). As such, they challenge approaches to smart city innovation that, as [54][179] note, are often top-down, utilitarian, and techno-centric.

I acknowledge that previous research and artistic work has produced technologies that align with some of the ideas in the catalog, e.g., “SelfieCafe” [208], “spread.gun” [98], “Urbanimals” [150], or “Hello Lamp Post” [194], all described in 6.2. Other designs hold resemblances with some of our ideas, e.g. a reviewer of our Mindtrek ’21 paper [14] pointed out that the façade of the Hotel WZ Jardins in São Paulo [93] is somewhat similar to “Building Art”, as it changes color and can be interacted with via smartphone; or “Shadowing” [58] is an interactive installation that, like “Silhouettes”, allows citizens to play with shadows from the past. My work adds value despite those similarities: rather than claiming exclusivity over the idea of designing tech that playfully augments the city, I show my situated process of identifying playful practices people do in the public space and building on them to speculate about how tech could respond to that playful potential. My approach can help designers to create technology that is grounded in people’s playful cravings rather than on the designer’s creative intuition—and that, as such, is more likely to afford experiences that are contextually sound.

Further, while exceptionally playful urban technologies exist in research and artistic domains, the reality is that they remain uncommon in commercial smart city implementations, where utilitarian approaches dominate [122]. I hope that the ideas from this project, combined with the other efforts cited in 6.2, contribute to challenging this trend. For example, some of my ideas rethink the functionality of urban navigation tools like Google Maps: rather than trying to optimize people’s movements, they support unproductive agendas such as highlighting the richness of the city and its citizens (see “Scavenger Hunt Plaques”) or producing pieces of ephemeral art (see “VanGo”). Other ideas hint at how emerging technology could extend existing, pre-smart city urban infrastructure in ways that put people’s wellbeing before urban efficiency, e.g. “Dancing the light” augments traffic lights by (1) turning them into opportunities for social connection and (2) giving people a chance to (playfully) determine the length of their wait—aligning with recent moves towards privileging pedestrians over cars, e.g. [193].

Other ideas show how urban play can be smoothly integrated into the ordinary flow of urban life in ways that enrich the socio-cultural fabric of a city, e.g. “Silhouettes” extends location-based games such as “Pokémon Go” by centering the player’s attention towards their environment and the other citizens with whom they share it, instead of inviting them to a fantastic virtual reality that has little to do with the ordinary flow of the city life.

In addition to its inspirational potential, my speculative catalog proved to be a valuable tool to engage diverse stakeholders to co-imagine the playful future of their city. The early ideas featured in it illustrate a breadth of possible design directions within a design space most average citizens are unfamiliar with. By making those design directions tangible and relatable, I was able to help non-experts and experts alike to collectively imagine desirable ways of shaping the foundations of smart city innovation, in ways that both their pragmatic needs, their values, and their playful desires were taken into consideration. That is a relevant move, as the ideal of a playable city brings about implicit tensions: while making the urban space more playful and enjoyable for some, it may create accessibility constraints for others or invade the privacy of citizens who would rather not be a part of the digital sphere. Using the catalog as a tool to facilitate multi-stakeholder conversations and engage average citizens, experts, and policymakers alike, allowed me to investigate how the ideas in my catalog (and other similar technologies) should and should not be implemented. I thus see the catalog not as a set of finalized design proposals but rather as a starting point to imagine what the playful future of our cities could be. Coupled with the reflections from my multi-stakeholder engagements, it can inspire future technologies that are both critical and fun.

A limitation of this project is that the findings might not necessarily be universally applicable. The play potentials I identified in the play-chasing phase of the project—and, as such, the resulting speculative design ideas—are grounded in existing practices my collaborators and I observed in specific urban settings. Some might not apply beyond the contexts where they

were found (e.g. those that emerged from playful urban traditions from workshop participants from Barcelona) and there could be many more play potentials on our list had we explored other urban settings. To use the list of play potentials, design directions, and speculative ideas presented in this chapter, designers should explore if and how they apply to the context targeted by their project. As noted by [30], there is a lot of value in designing for the particular as it “enable[s] us to capture the richer and more complex nuances of a particular situation or user, hence also directly challenging the assumptions we make as researchers”. Taking my work as a point of departure, designers can use SPD and other participatory techniques to further understand what kinds of urban experiences their target citizens long for. That will support the design of urban tech that realizes the playful potential of the targeted context. This chapter provides some guidance for how to do that: it shows how I leveraged two SPD methods to chase play potentials of urban spaces and use them to drive design. I hope that these strategies empower designers to identify design opportunities for urban play in their targeted design context, adapt our proposed play potentials and design directions, and find new ones that better respond to the specific idiosyncrasies of the cities they design for.

## Chapter 7

# AN EMERGENT TOOLKIT OF SITUATED PLAY DESIGN METHODS

Experimenting with the Situated Play Design approach in the case studies presented above brought about domain-specific knowledge that can advance technology design and research focused on enriching the socio-emotional texture of mealtime and urban experiences. In this chapter, I unpack a second outcome of that work: from a methodological standpoint, the case studies helped me to begin to illustrate, show the value of, concretize, and make actionable the SPD approach. In each case I experimented with different ways of chasing play potentials and making designerly use of them. As a result, I developed a set of strategies that might be useful for others. Here I formalize three of them as an emergent toolkit of SPD methods. My approach to developing those methods was to engage first-hand with co-design activity. I reflexively examined my own practice to formalize my learnings into actionable insights that could guide other designers to do similar work. To develop the strategies presented in this chapter, I took as a point of departure some of the methodological opportunities highlighted in Section 4.6. I focused on three of them, as described below:

The first two SPD methods I present here will help designers to “chase play potentials”, i.e. to identify forms of playful interaction people already enjoy in a particular context and articulate them as inspirational design material. First, building on my earlier call to further explore how culture and traditions could be a source of contextually grounded inspiration in play design, I present a flexible strategy for conducting “Play & culture workshops”. I show how, in my work, I uncovered forms of playful engagement that, insofar as they are ingrained in cultural rituals developed throughout the years, might reflect people’s preferences when it comes to situated and emergent play (Section 7.1). Second, I tackle the challenge of documenting playful things

that happen in the wild, with or without the presence of a designer—spontaneous events that could arguably be an invaluable source of playful inspiration but are often hard to anticipate and document. To respond to that challenge, I build on my use of social media as a platform for play-chasing to provide actionable advice for designers interested in using it as a source of inspiration about the kinds of playful things people do in their daily routines (7.2).

The last SPD method I present addresses the second phase of SPD: co-designing to realize the playful potential of day-to-day activity. To do that, I tackle another opportunity highlighted in 4.6: rethinking speculative methods to better respond to the idiosyncratic needs of playful design. In 7.3, I present a method that enables multi-stakeholder, situated, and play-focused speculation in remote settings, ideal for projects where designers cannot (or prefer not to) engage stakeholders in person—such as mine, where the COVID-19 pandemic made it impossible to co-design in person. Building on the work described in Chapter 5, I formalize a methodological proposal that builds on my experience of engaging stakeholders remotely to co-experience, -discuss, -rethink, and/or -iterate half-baked technology ideas—involving them to co-define the foundations of emergent design spaces as co-creative partners. My proposal will help designers to engage diverse stakeholders to speculate about increasingly playful technology futures in emergent, underexplored, even futuristic design spaces, even if the conditions surrounding a project make it challenging to do in-person co-design.

Overall, in this chapter I formalize and make actionable three strategies, which proved useful in my work, as the first components of a Situated Play Design toolkit—a toolkit I hope both myself and others will continue to populate with new methods. I hope that this work begins to make the SPD approach actionable and that it inspires other designers to share strategies they have found useful in their work. As noted in Chapter 4, I do not see SPD as a rigid, static methodology, but as a flexible set of strategies for bottom-up, situated, and participatory play design; one that will be richer and stronger if co-developed by a diverse pool of designers.

## 7.1 Play & culture workshops

In Situated Play Design, there are open methodological challenges yet to be tackled—in Section 4.6 I highlighted five of them. Here I address one of those challenges: the lack of actionable tools that allow designers to chase and make designerly use of play potentials embedded in traditions and other kinds of cultural rituals. Building on the work I did in the two case studies (Chapters 5-6), I explore how to use traditions as a source of playful inspiration, beginning to answer the question: How can we identify interesting manifestations of playful engagement that are culturally embedded, and unpack them into a useful design material?

Play shapes and is shaped by culture; everyday practices are imbued with play [52]. Some even argue that societies can be understood by looking at how their members play. Culture can thus arguably be a rich area for chasing play potentials: it contains rich information about the kinds of playful engagements people are familiar with and long for. Throughout my Ph.D., I chased play potentials in culture and traditions in different projects: In the mealtime tech case study, I conducted an in-person workshop where a group of designers and researchers used a range of tangible and embodied design tools to play with and analyze a collection of playful food traditions from all over the world. In the urban technology project, due to the COVID-19 pandemic, I had to experiment with an online approach: I conducted a workshop over Zoom and Miro, inviting a range of relevant stakeholders in the area of urban innovation to share, play with, and reflect on the potential of playful urban traditions and street games from their cultural backgrounds. I also conducted similar interventions outside of the scope of these projects, in collaboration with other researchers, e.g. a workshop where I helped some colleagues interested in child-computer interaction to investigate increasingly playful avenues for children's mealtime technology design, by experimenting with children-oriented cultural food rituals [57], or another workshop where I taught chefs and food designers how to source inspiration from culture and traditions to make their creations more playful and interactive.

Despite their differences, in all those cases I followed a similar process: I gathered a group of stakeholders relevant to the targeted design space (whether in-person or virtually), I invited them to share traditions from their culture, we played with and discussed the traditions, we sought interesting forms of playful interaction embedded in them, and we experimented with the value of those play potentials to support ideation. In the next two sections, I describe the “Play & culture workshops” I conducted as part of the case studies described in Chapters 5 & 6; I hope my hands-on experience inspires other designers to conduct similar interventions.

### **7.1.1. In-person workshop using tangible conversation tools**

As part of the mealtime tech project (Chapter 5), I ran a workshop aimed at chasing play potentials in food culture and traditions. It took place at CHI Play '19 [4] and brought together 18 participants including the organizers (myself and 6 colleagues). Participants has diverse cultural and professional backgrounds. They came from or had lived in: Spain, US, Canada, Australia, Denmark, France, Germany, Israel, Colombia, Philippines, China, Turkey, Portugal, Belgium, the Netherlands, and the UK. They practiced in industry and academia, in computer science, design research, gamification, interaction design, business development, and HCI.

As part of the workshop registration process, we asked participants to share playful food traditions from their country, community, or family. We did not provide a strict definition of what traditions could be; rather, we invited participants to make their own interpretation and submit what they wanted. We asked them to include at least three items in their submission: the tradition's name, a short description, and a graphic representation. Inspired by “design workbooks” [111], we formatted all the traditions into a catalog<sup>15</sup> so we could easily work with

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<sup>15</sup> Link to the catalog of traditions: <https://bit.ly/2W3u5G8>

them during the workshop. We also prepared a set of tools to facilitate the conversations between participants. Since our aim was to look at traditions from different lenses, we designed the tools to afford different kinds of thinking, ranging from analytical to embodied exploration. Here I describe them, ordered from most analytical to most embodied:

The “Playful lenses” (Figure 45A) took the form of an envelope full of paper sheets featuring pre-defined checkboxes people could use to annotate the key traits of a playful food tradition. Checkboxes were based on theories of play [20][52][134][154][207][217][218][229] and HFI [5][7]; they were meant to help people to dissect the experience afforded by the traditions.

“Fun’ometer” (Figure 45B) followed a similar principle: it was meant to enable participants to analyze important traits of traditions. Yet, two key differences set it apart from the “Playful lenses”: First, it took the form of a tangible tool where analysis was not performed through checking boxes but through posting, attaching, or clipping pieces. Second, the labels used to analyze traditions were blank, i.e. participants could define their own criteria of analysis.

“Tweak the tradition” (Figure 45C) shifted participants’ attention from analytical to creative thinking. It took the form of a deck of cards that prompted people to imagine how traditions would be if modified in different ways, e.g. “what if it was competitive?”, “what if it had the rule of no talking?”, or “what if it involved more people?”. By disrupting traditions with new design choices, participants could get a sense of what the playful potential of that experience was.

“Bloopers potentials” (Figure 45D) focused participants on a very specific ludic component of traditions: their capacity to provoke hilarious situations. The tool was comprised of a cinema clapperboard and a banner saying “blooper”; it invited people to think about what could go hilariously wrong in a tradition and enact that in front of their camera.



Figure 45. The play & culture toolkit. A: the “Playful lenses” and people using them. B: the “Fun’o’meter”. C: participants playing with “Tweak the tradition”. D: people using “Blooper potentials” to find the hilarious side of a tradition. E: participants using “Play a role” to enact a tradition.

Finally, “Play a role” (Figure 45E) was the most embodied tool in our toolkit. It consisted of a box including a set of theatrical props (a wig, a hat, a moustache...) and a stack of persona cards. Participants were invited to choose different personas and enact traditions as if they were those personas—exploring how different kinds of people might approach the traditions.

At the workshop, we experienced, discussed, and analyzed the collection of playful food traditions in groups of 3-4 people (~75 minutes). Each group was assigned one of the tools and a sample set of traditions; we ensured all traditions were examined by at least two groups. Experiencing the traditions from the different positions enabled by the tools allowed us to explore different angles of what made them fun and how they facilitated interesting

social experiences. Afterward, groups shared their findings as post-it s (~20 minutes), posting them on a large table and clustering them to begin to identify recurrent patterns (Figure 46)— i.e. play potentials that could inspire design. To investigate the inspirational potential of those play potentials, we created small groups again and used both food and other materials to ideate play-food experiences inspired by them (~60 minutes). We concluded the workshop with a discussion of the prototypes made by participants (~45 minutes).



Figure 46. Analysis phase of the workshop. Top: participants adding their post-its with playful findings on top of each tradition card. Bottom: participants clustering the post-its to identify recurrent play potentials.

Throughout the workshop, we documented our play-chasing activity in different ways. First, we recorded the workshop conversations, including the smaller group ones. We also invited a photographer to the event, to capture the workshop activities. Finally, we took quality photos of the play-chasing results, i.e. the clustered post-its featuring the play potentials inspired by food traditions. After the workshop, I did a second round of analysis: I examined the recording of the conversation that took place while participants clustered play potentials and used the outcomes to challenge and solidify the workshop insights. I shared my second-wave analysis with the other organizers so they could dispute it. The results are the play potentials presented in 5.3.2 and [12], which I then used to inspire my design work (see Chapter 5).

### **7.1.2. Online workshop using a Miro collaborative board**

As part of the urban tech project (Chapter 6), I conducted a workshop where I invited diverse stakeholders relevant to urban innovation to investigate forms of urban play that could inspire smart city innovation. In this case, the workshop took place online, due to COVID-19 social distancing regulations. That was a challenge; it forced me to rethink the processes I had used in the “Play & culture workshop” above, to fit an online format. The workshop took 3 hours and was held over Zoom and Miro. 13 people participated, including myself and another facilitator. Participants had professional backgrounds I thought were relevant to play design and smart city innovation: two gamification consultants, three experts on folk games, a game developer, an interaction designer, a communication designer, a philosopher, an architect, and a journalist specialized in emergent technology. Before the workshop, I crafted a Miro environment<sup>16</sup> to facilitate conversations. I populated it with playful urban traditions from previous research and shared it with participants a week in advance so they could familiarize

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<sup>16</sup> See the full Miro board here: [https://miro.com/app/board/o9J\\_klj3VPQ=/](https://miro.com/app/board/o9J_klj3VPQ=/)

themselves with the traditions (Figure 47). Since participant-brought traditions were very helpful in the food-play workshop, here I also invited participants to add new traditions to the collection, in the form of street games, urban rituals, or fun personal experiences they had lived in their cities—again, providing a loose definition of what those items could be.

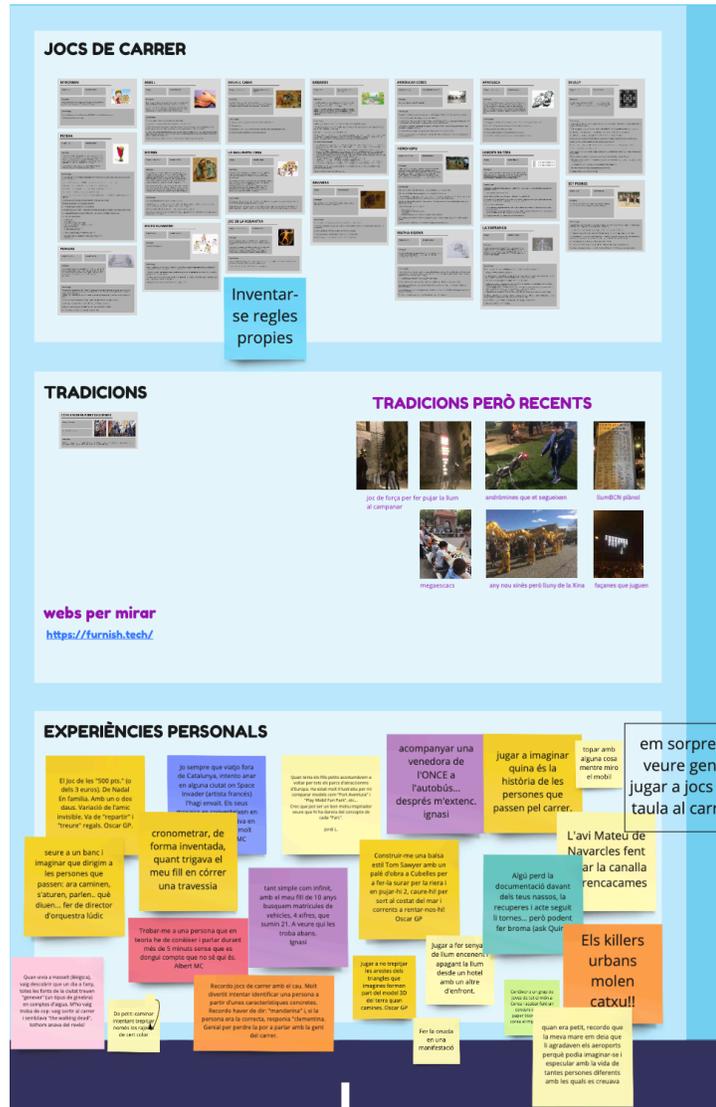


Figure 47. Section of the Miro board featuring the collection of playful urban traditions, games, and personal experiences (in Catalan). Top: street games from my previous research. Centre: urban traditions, some from my research and others from participants. Bottom: post-its with playful experiences participants lived in the urban space.



Next, we grouped participants again and invited them to brainstorm how commonplace urban infrastructure (a bench, a light pole...) might afford technology-mediated experiences inspired by one or more of the play potentials we had identified earlier (~45 min.). Groups were given space in the board to ideate; we also provided a collection of images of urban infrastructure they could use to prototype their ideas as annotated collages (Figure 50).



Figure 50. Prototyping section of the Miro board. Left: the “marketplace” with images of urban infrastructure. Right: the prototyping boards of the three participating groups.

To close, we built on participants' speculative ideas to reflect on the relevance of the play potentials found during the workshop and, more broadly, of my situated and playful approach to smart city innovation (~45 min.). Throughout, participants took notes the Miro board. I left it open for two weeks, so people could continue to share their reflections after the workshop. After that, I analysed both the annotations on the Miro board and the workshop recordings to synthesize the ideas shared by participants. My analysis was refined in a conversation with the other workshop facilitator. The result was a list of 9 play potentials inspired by culture and traditions, each instantiated by at least one urban game, ritual, or personal experience from the workshop. As described in Chapter 6, those play potentials had a significant impact on the design work I did in the urban technology project; they were at the core of several of the speculative ideas my colleagues and I produced and later discussed with stakeholders.

### **7.1.3. Advice for conducting play & culture workshops**

Here I provide some hands-on advice for designers interested in conducting “Play & culture workshops”. My advice stems directly from my hands-on experience with conducting these kinds of events and is meant to make them actionable for other designers.

**The different affordances of online and in-person formats.** The first thing to consider is whether to run “Play & culture workshops” online or in person. In my experience, both can be useful approaches. However, I noticed that the online format makes it a bit harder for people to focus on the fun aspects of traditions rather than on other, more pragmatic considerations (access, usability, technical constraints...). Being in-person and engaging with traditions embodiedly creates an atmosphere where it is easier for people to let go and focus on the experiential texture of traditions, rather than rationally examining them. I suggest that, when conducting a “Play & culture workshop” online, designers set mechanisms in place to prevent people from overthinking things, to help them focus explicitly on what makes traditions fun.

**Online workshops support rich and democratic documentation.** A key strength of online workshops, especially when mediated through tools like Miro, is that they support rich collaborative documentation. Once people understand their basic functioning, tools like Miro make it easier for them to participate: First, they remove the constraints derived from physical spaces, e.g. someone not being close enough to the wall where post-its are being clustered. Second, they mitigate imbalances of power: one does not need to take ownership of a marker or get in front of others to write something on a shared wall. Finally, they enable richer forms of documentation thanks to the multimedia affordances of web technology. In my experience, the online format enabled a richer, more democratic, and more diverse documentation.

**The importance of creating space for rich engagement with traditions.** In both cases, I found it useful that people looked at traditions before engaging in the play-chasing activity. That served as a sort of warm-up exercise that prepared them to examine what made the traditions fun. If possible, designers might want to invite workshop participants to check the collection of traditions before starting to formally chase play potentials—ideally on their own, during the days before the workshop. Aside from preparing participants for the workshop activities, that will enable them to suggest traditions of their own. Alternatively, if participants cannot or do not want to explore the traditions before the workshop, I suggest facilitating that early exposure at the beginning of the workshop, as an ice-breaking exercise. I also suggest designers encourage participants to not only check, but also try the traditions out: that will help them approach play-chasing with some previous experience of what traditions feel like, which will help people to examine those traditions in more of an experiential way.

**Chasing play potentials requires people to immerse themselves into the experience of traditions, and that takes time.** To facilitate in-depth, rich play-chasing engagement, I suggest designers allocate plenty of time for the play-chasing activities, somewhere between 1-2 hours. In my experience, it is important to allow people to take their time to really engage

with these tasks, without the pressure of time constraints, so they can look at traditions through the perspective of their lived experience rather than overlooking them by only thinking about them at a rational level.

**How to use the play & culture toolkit in an in-person workshop.** The play-chasing tools I created, described in 7.1.1, can help to stimulate rich discussion at in-person workshops. They afford different ways of play-chasing: The two analytical tools (“Playful lenses” and “Fun’o’meter”) are easy to use; yet, they will not necessarily help people to look at traditions from the lens of experience. They may be better suited for participants with little experience with co-design workshops, who may need more guidance and structure. “Blooper potentials” and “Tweak the tradition” can help to stimulate people’s creative capacity; in my experience, they worked very well to explore what made traditions fun and how they might become even more playful. Finally, the improvisational nature of “Play a role” can be very useful as well, but relies largely on the people’s personality and/or expertise with enactment; in my experience, it is better to use it only with participants who have experience with enactment, or to allocate time for a facilitator to help out. Further, I suggest not to overburden people with more than one play-chasing tool during a workshop. The tools are complex enough to require some time for getting used to them; further, they afford fundamentally different ways of engaging with traditions. Using different tools over the course of a workshop will force participants to keep shifting gears, to the detriment of an in-depth engagement with traditions. To help people stay immersed in the play-chasing activity, I suggest creating small groups and assigning a tool to each of them. Then, designers can facilitate a follow-up discussion where groups share their findings and discuss how the outcomes from their different processes can be combined.

**From play-chasing insights to play potentials.** In my experience, it can be very fruitful to begin to cluster participants’ play-chasing findings at the workshop, with participants, using post-its on a shared surface—both in a virtual and an in-person setting. I suggest designers

may want to facilitate that task in ways that do not enable too much thinking or second-guessing, to discourage people from overthinking their spontaneous thoughts. Once all play-chasing insights have been shared on a common surface (a large table, a wall, a virtual board...), designers can facilitate a second round of analysis to cluster the post-its, i.e. to organize people's findings about the playful aspects of traditions into an early list of play potentials. In my experience, structuring the analysis as a combination of these two steps allowed people to, first, share their thoughts even if they were not too formalized or clear, and second, to make sense of them organically as other people shared theirs. I also suggest that, after the workshop, designers do a second-wave analysis to make sense of, enrich, and consolidate the emerging list of play potentials. Workshop results will likely be chaotic; a follow-up analysis will help designers to sharpen the outcomes and enhance their value.

**The importance of making creative use of the chased play potentials.** In my experience, allocating workshop time for a creative exercise will trigger reflections that add nuance to the chased play potentials. I recommend concluding the workshop with a prototyping task where participants are prompted to build on the chased play potentials to speculate about novel and increasingly playful technologies or experiences in the targeted design space. Though the resulting ideas will likely be underdeveloped or even flawed, the associated reflections can help designers to add nuance to the prior workshop discussions and to begin to identify ways of using the emergent list of play potentials to inspire future design and research.

#### **7.1.4. The potential of culture and traditions to inspire design**

Play potentials inspired in cultural traditions have a strong cultural grounding: they present playful experiences and interaction mechanisms that have evolved over time and have become, in different ways, part of people's lives. Some of those play potentials emerge from celebratory traditions and special events, while others originate in rituals that take place in

more commonplace, mundane events. One way or another, the fact that the traditions behind them have gradually become part of people's ordinary practices and social rituals indicates that their underlying playful mechanisms are relevant to people and represent forms of social and playful engagement they enjoy. Previous research suggests that, in day-to-day scenarios like food practices, it is important that technology builds on existing, contextually-sound experiences and interactions rather than introducing new and extraneous ones [178]. This approach resonates with my call for increasingly situated approaches to play design (see Chapter 4 or [6]). "Play & culture workshops" respond to that call: they enable the creation of collections of play potentials that emerge directly from diverse people's cultural practices and can therefore inspire novel and increasingly playful technology designs.

The outcomes of "Play & culture workshops", i.e. the play potentials, are mainly inspirational: they turn designers' attention to non-technology scenarios to inform the design of technology that is situated and responsive to people's playful desires. They can inspire future technology that responds to playful desires that traditions and cultural expressions have been embracing throughout history. I hope that the set of strategies I described in this section help designers and researchers to find play potentials embedded in culture and traditions beyond the spaces of mealtime and urban technology design, and that as such they support the design of tech that affords increasingly social and material experiences and embraces a richer idea of what playing in our day-to-day can mean. I am also excited to see how other designers extend my findings in the two design spaces I explored during my Ph.D.; I hope that they continue to chase play potentials in traditions relevant to mealtime and urban spaces, and that they enrich the set of inspirational play potentials as a result. I also hope that, in doing so, they come up with new strategies for chasing play potentials in culture and traditions, and that they share them to enrich the set of methods available in SPD.

## 7.2 Chasing play through social media

Here I present a set of strategies that address another methodological challenge emerging in SPD: it is difficult to capture and make design use of the playful interactions and behaviors that take place in people's day-to-day. These events are spontaneous and hard to predict; as designers, we are often not prepared to document the play potentials we see and experience every day, especially when we are not wearing our designer hats—which is, paradoxically, when more playful things are likely to happen. Similarly, we cannot always get access to (and document) the emergence of playfulness in other people's routines, without influencing their actions. That makes it challenging to identify play potentials in our and other people's ordinary practices, in ways that capture what is natural and spontaneous about them. But people's daily activity can be a rich source of play potentials, and not having access to it is arguably an incalculable loss of knowledge that could otherwise inspire design. Considering this, I wonder: How can we chase play in the wild, even when we are not acting in our designer capacity, and therefore we are not fully equipped with our research tools, or when we do not have in-person access to the design context at hand? I see a need for strategies that (1) help us to effectively respond to the emergence of playful engagement when we are away from our design and research environments and (2) enable us to explore our targeted design context and relevant stakeholders when we cannot have in-person access to them.

Here I build on my work in the two case studies described earlier, as well as on some side projects I worked on during my Ph.D., to propose two social media-based strategies that can be used to chase play potentials. I focus on two use cases, both meant to support ideation in playful design: First, using a dedicated social media account to document playful situations that take place around us, in first person, in the wild, when we are not equipped to document them (Section 7.2.2); Then, exploring other people's existing social media content to collect instances of playful behavior that help to sensitize to their diverse playful practices (7.2.3).

Early outcomes of this work were presented as a late-breaking work at CHI'20 [11], as well as at a CHI'21 workshop I co-organized with colleagues [15]. A full paper reporting the outcomes of this methods research is in progress and will be submitted for review in the coming months. I hope my hands-on experience and associated reflections inspire other designers to use social media in their play design work.

### **7.2.1. Existing uses of social media as a design and research tool**

Social media has been used before as a research tool, both in HCI and in many areas of design. In HCI, social science methods are often used to analyze social media content and produce generalizable knowledge by identifying patterns in people's behaviors or opinions, e.g. research on self-perception [234], people's mood [129] and feeling of connectedness [204], or political opinion [71]. Those are valuable efforts: by modeling aspects of human behavior analytically, they provide designers with generalized ideas of phenomena relevant to their work. Yet, the outcomes of these processes are often more informative than ideation-oriented: they provide objective empirical data but do not necessarily help us to sensitize to and empathize with the idiosyncrasies of users and their contexts in ways that stimulate our creative capacity—which is key in ideation. I see a lack of social media strategies that are generative rather than validative [112]: methods “by and for designers” that align with interpretive and imaginative design-led approaches [100] to not only help designers to know, but to inspire them and help them to empathize with stakeholders to imagine and create.

Beyond HCI and technology design, using social media in designerly ways is a commonplace practice, e.g. to collect inspirational content through Pinterest mood-boards [152]. These practices are especially common in fields with a strong visual focus, e.g. fashion, audiovisual design, architecture, or product design. They generally center on creating visually stimulating collections that help designers produce aesthetically interesting work [156]. Yet, though social

media is rife with content that reveals people's day-to-day behavior, not many works employ designerly social media practices with a focus on interactions. I have not seen design-oriented collections of playful interactions, let alone actionable advice for creating them. I see this as a gap that should be addressed: while visual aesthetics are important in interaction design, we could also benefit from inspirational collections of contextual playful engagement.

Overall, existing uses of social media in design & HCI are either focused on visual aesthetics or validative rather than design-oriented; yet interaction design benefits from focusing on activity and interactions [245] and being generative [112]. Here I describe how I addressed that gap in my own work, using social media to chase play potentials to inspire design.

### **7.2.2. Using social media to document: capturing playfulness as it emerges in the wild**

Virtually every day, virtually anywhere, people act playfully. Were these playful occurrences accessible, they could be an invaluable inspiration source for designers. Yet, documenting playful engagement can be challenging [244]: it is often ephemeral and elusive, and takes place in situations where we may not be acting in our research capacity. That challenges our ability to chase play potentials and use them to drive our work. Inspired by first-person [161] and embodied ideation [244] methods, I see a need for tools that help designers document, share, and make inspirational use of play potentials that emerge around them in the wild.

Here I respond to that need: I share my experience of using Instagram to document mundane playfulness to collect design inspiration. During my Ph.D. I created an Instagram account (<https://www.instagram.com/chasing.play>) and used it as an online repository of playful situations I saw or experienced in my day-to-day. That effort was not tied to a specific design project; it was meant to be a growing source of inspiration for my work and other designers'. Yet, eventually, the account proved to be a useful inspiration source in my urban tech design work, since many posts collected in the account had to do with public spaces.

**Step 1:** If you see something playful, capture it without overthinking it. You can remove it later if you decide it doesn't fit.

**Step 2:** Ideally, take a photo or a video of the play potential. Otherwise, do you can to convey what you saw—be creative! A drawing, a short text, a video of yourself describing the situation... Any format works as long as it conveys the play potential.

**Step 3:** Use hashtags to add meta-data about the play potential, starting with the general tag *#playpotential* and following with information about the players (e.g. *#children*), the context (e.g. *#urbanspace*), the type of play experience (e.g. *#thrill*), etc..

Figure 51. Our v0 protocol for using Instagram to chase play potentials.

To initiate the repository of play potentials, I chose Instagram given its popularity and its core media form which, as opposed to other platforms, privileges visual content intertwined with text. I believed that that would be an important asset to my agenda of capturing ephemeral playful engagement. Once active, I started using the account to capture playful situations I found in the wild. I invited five colleagues to participate: Jared Duval, Elena Márquez Segura, Laia Turmo Vidal, Ella Dagan, and Alexandra Pometko. Rather than pre-defining robust guidelines from the onset, we created a tentative “v0 protocol” (Figure 51) that was simple and malleable enough for us to appropriate it and adapt it along the way. Over a period of 1-7 months (depending on each person's availability), we engaged hands-on with the protocol, experiencing what worked and did not. To get a glimpse into our experience, we collected our thoughts as “autoethnographic narratives” [89]; we were free to document, however we wanted, what we found interesting, relevant, difficult, etc., concerning both the captured play potentials and our use of the tool. We analyzed the narratives using an “inductive thematic analysis” approach [123]. The six participants (including myself) did a first round of coding independently and shared their analyses. Then, I clustered the individual analyses into a final set of codes. For increased reliability, the final analysis was shared with the rest of the team so they could contest it. Here I describe the learnings from our experience of using Instagram to document instances of playful behavior.

### **Documenting and uploading mundane interactions: ethics and data privacy issues.**

Our first challenge was the issue of data privacy, as chasing play potentials in the wild likely involves sharing pictures/videos of human subjects. Early in our work, we avoided making



Figure 52. Strategies for posting de-identified play potentials. A: Photo of a person with an overlaid sketch displaying their behavior & expression. B: Photo of a setting where a playful situation happened. C: Sketch of a playful situation.

posts where people could be identified, while we worked with UC Santa Cruz's IRB Office to explore the implications of posting identifiable human subject data. During that period, we used a range of strategies to avoid sharing identifiable data (Figure 52): (1) anonymizing people's faces; (2) photographing the settings where interactions took place, the objects used, or the tangible outcomes of playful behaviors, using captions to describe interactions with words; or (3) representing playful situations with a sketch. While those strategies often implied a loss of information and inspirational potential, they allowed us to collect and share several play potentials in situations where we might otherwise not have been able to. Our efforts with the IRB Office helped to clarify the implications of posting content featuring people on social media—an activity that is paramount to the kind of process I am discussing here. From there, we established a protocol that was ethically responsible and adhered to data privacy regulations: The first step is determining if consent needs to be secured for taking a photo/video. The expectation of privacy depends on the setting: In private settings (a house, a shop, a backyard...), people have a heightened expectation of privacy; as such, consent must be secured in advance. Requirements vary between countries: while electronic signature is acceptable in the US, the EU requires wet signature on a printed form. In public settings (the street, a public building...), the expectation of privacy is lower; consent to take a photo/video of someone is not required. Yet, consent must be secured to publish that content

—again, according to the regulations of each country. If consent cannot be secured, content must be anonymized before publication: de-identifying faces, altering voices, and blocking out tattoos or other identifying features. As described above, we did that manually (Figure 52A), but adding anonymization tools to social media apps (e.g. as Instagram filters) would make that process more transparent for subjects and straightforward for designers.

**How to document play potentials?** During our explorations, we took different approaches to posting play potentials, e.g. taking videos or photos, writing descriptive texts, drawing sketches, re-posting existing posts, or taking screen captures of other kinds of digital content. Some posts were more descriptive than others, allowing varying degrees of interpretation. Such diversity of formats enhanced the inspirational potential of our collection and allowed us to convey what we saw or experienced in ways that made sense. Yet, we noticed that posts often worked better when they included three items: (1) an image, video, or sketch illustrating the playful situation, (2) a written account of what we thought was inspirational about it, and (3) a series of hashtags highlighting relevant keywords.



Figure 53. Play potential post types. A: an emergent playful interaction (see <https://bit.ly/2Mn2ebX>). B: a play activity trace (<https://bit.ly/3963s4T>). C: a playful trigger (<https://bit.ly/2Zg8rvk>). D: a playful creation (<https://bit.ly/2QfBYRB>). E: a playful message (<https://bit.ly/2MmdepT>). F: a reflection about play (<https://bit.ly/35RO4ab>).

**A diversity of play potentials makes for a richer collection.** All the play potentials we documented shared an important quality: they featured emergent playful activity that was contextually meaningful. That sets the resulting collection apart from commonplace uses of social media in design: rather than focusing on the look and feel of an artifact, it features interactions as the core inspirational material. Other than the focus on interactions over visual appearance, the resulting collection is quite diverse: it features posts related to diverse areas of human life, e.g. food practices, urban space, leisure time, or social media activity. Some posts describe experiences lived by the authors, while others are observations of other people's playful behavior. That diversity is, in part, a result of the open-ended approach we took to deciding what might or might not fit in our collection. It helped us in two ways: First, we avoided overthinking the playful situations. Whenever we saw or experienced something we felt might have inspirational value, we posted it straight away, without trying to understand it or overthink how to represent it. The posts we produced would be analyzed later, by us or by other designers, so we did not force ourselves to do that analysis in situ. It was not up to us to decide if our post might or might not be inspirational, and for what; that would be up to whoever used the repository as design material. By freeing ourselves from filtering what did or did not fit, posts were more spontaneous and captured better what we saw rather than our analytical interpretation. Second, we posted play potentials we could not have thought of before, enriching our idea of what play potentials could be or look like. Our emergent collection disrupted our initial assumptions about the type of play potentials we could capture on Instagram. Originally, we aimed to document "Emergent Playful Interactions": playful things people do, captured as they happen, e.g. Figure 53A. Yet, we quickly realized many posts reflected other manifestations of mundane playfulness. First, there were several "Play Activity Traces": visible outcomes of playful activity that took place before our presence, e.g. Figure 53B. A few posts documented "Fortuitous Playful Triggers": unintentional situations that led to the emergence of playfulness, e.g. Figure 53C. Other posts showed playful acts of

creative expression, including: “Playful Creations”, careful designs that someone made to provide a playful experience to others, e.g. Figure 53D, and “Playful Messages”, spontaneous and likely asynchronous communications that someone created to make non-located others laugh, e.g. Figure 53E. Finally, other posts portrayed situations that foregrounded “Reflections About Play”, e.g. Figure 53F. Seeing that play potentials could take such different forms helped us to start paying attention to playful events we may have ignored otherwise. Arguably, that contributed to a richer collection with a stronger inspirational value.

**Turning the posts into inspiration.** Originally, I did not plan to use @chasing.play towards a concrete design goal. Yet, I noticed that several posts were relevant to the design work I was doing. For example, though in the smart city project (Chapter 6) I already had strategies in place for chasing play potentials, I ended up considering the posts in the account as well. In doing so, I faced a challenge: Instagram’s interface makes it hard to make inspirational use of it: all posts are displayed by date and they cannot be clustered or filtered (even if marked with hashtags). To work around that, I explored ways of clustering posts to support ideation. For example, I used Instagram’s story highlight functionality to create compilations of posts tailored to some of my design projects, e.g. with posts relevant to urban playfulness. That process allowed me to add a second layer of inspirational data to the posts, in the form of curatorial elements (annotations, gifs, sketches...) to complement to existing photos/videos. I also thought of other strategies, e.g. transferring posts to other tools that allow the creation of mood boards (like Pinterest), but decided to stick to Instagram to avoid manually copying all posts into another platform. From that process I suggest that social media providers like Instagram might want to consider affording more interactive ways of navigating posts.

Building on these learnings, here I provide advice to designers interested in using social media to collect and make inspirational use of emergent forms of mundane playful activity:

- Before posting play potentials, designers should understand the regulations for taking and posting identifiable human subject data in their country. They should have a protocol for obtaining consent and anonymizing the data, wherever necessary. Above I described the mechanism we used, which applies to US and the EU regulations.
- Designers will benefit from embracing a flexible idea of what play potentials are. They should not overthink whether a post fits or not: if they feel something might be playful and inspirational, they should post it. It will rarely be productive to articulate analytically why the post is great—they will have the opportunity to do that later, during ideation.
- Designers should portray their playful observations in ways that are useful, while ensuring posts capture enough about the playful event. In my experience, that will help other designers to better empathize with key contextual aspects that facilitated play.
- When using the repository as an inspirational resource, designers can use Instagram stories to create compilations of posts they think might be relevant to their work. Alternatively, they use other platforms like Pinterest to create dedicated mood boards.

### **7.2.3. Using social media to sensitize: seeking posts featuring people’s playful activity**

Social media is rife with content that displays mundane ways of being playful. Many posts people produce daily could potentially inspire playful design. While social media content has been used and analyzed before for validative purposes, as a designer I am also interested in using it to empathize with stakeholders and sensitize to their playful practices—in ways that inspire me to be creative and produce design ideas. As noted in 7.2.1, those uses of social media are commonplace in many areas of design, but less so in HCI. Here I build on my experience of using social media to empathize with people’s playful activity in urban spaces,

as described in 6.3.1. My reflections are also influenced by two other projects, where I acted as a methodology consultant to help my colleagues to identify play potentials they could use to drive their work: a project exploring increasingly playful and social drone futures [199], and another exploring the playful potential of accessible tech [86]. Here I report the learnings from those projects, highlighting what worked and what did not, and providing actionable advice for designers interested in using social media to sensitize to other people's playful practices.

**Using and re-posting content from other people's accounts.** When using other people's content for design/research purposes, it is important to pay attention to the ethical and legal implications of our actions. Here I share the outcomes of my conversations with UC Santa Cruz's IRB Office, which apply to the US and the EU: content posted on a public source (e.g. an Instagram account that is not defined as private, whose content can be seen by anyone, including those who were not explicitly granted access), can be considered public. If that is true and the content is not sensitive, consent does not need to be secured from the original author: the content is public already. Consent from third parties appearing on a photo/video does not need to be secured either, because it was already made public by someone else. In contrast, if the original post was made on a private source (e.g. an account whose content can only be seen by those who were explicitly granted access), consent by the author must be secured before re-posting. If the post has identifiable data of third parties, consent from them needs to be secured too or, alternatively, their identifying features must be anonymized. Wherever required, consent must be secured under the regulations of the applicable country.

**Playing with social media search algorithms.** Social media search algorithms curate the content shown to a user. When searching posts, you will hardly get a complete view on a topic: you will see it through the lens of what the algorithm deems interests you. That is an important consideration to make when sourcing play potentials on social media: since the algorithm curates the search results, the resulting collection will likely show an incomplete

version of reality. E.g. in the urban technology project, one of my research assistants found that, when looking for playful practices in public spaces, Instagram's search engine mostly showed photos of young western people doing yoga. Though our collection was enriched with posts collected by others in the team, who found content from other audiences, the results were clearly impacted—we could not consider them representative of all kinds of audiences who might be relevant in urban innovation. That might not necessarily be an issue if our aim is generative rather than validative: instead of producing a precise model of reality, we can benefit from an incomplete collection of posts to generate new design ideas, even if they do not cover all that reality has to offer—so long as we then circle our ideas back to stakeholders and continue to iterate with them, as I did in my case study (see 6.5). We must be aware that our source of inspiration will steer us in a direction that might not represent all the actors relevant in the design context at hand. There are mechanisms to work around it, e.g. involving multiple designers in searching posts, so the sum of their personalized search results adds up to a more diverse collection; or creating a new account for the search, in which case the algorithm will not be influenced by any activity. Yet, in that case the algorithm will still not be completely neutral, e.g. it might suggest only children-friendly content, or focus on what is popular at the moment. The algorithm's tendency to feed posts that align with our past social media activity can also be used to our advantage: after days of looking for play-related posts, the amount of playful content in our search results grew considerably. The algorithm picked up on our tendency to react more to playful content, and that made it easier to find posts displaying playful behavior—even when we were not actively seeking them.

**Using keywords to search for content.** In seeking playful content on social media, we experimented with different kinds of keywords to see which might work best. Interestingly, we found that obvious keywords such as “play”, “fun”, “joy”, or “playtime” might not be the most useful to find spontaneous playful activity. Those buzzword-type of keywords were often used

in posts that were performative and featured staged situations with an intent of advancing the author's social status agenda rather than of displaying an actual playful act. For example, we saw countless, clearly staged, posts about children's play that parents carefully created to show off their parenting style. In response, we started using less obvious keywords (e.g. "laughter", "crazy", "funny") or even strange or poorly constructed ones (e.g. "lol", "haha", "sofunny", "playallday"). While those searches brought about a smaller number of posts, from a qualitative perspective we the results were more relevant and spontaneous. We also found location-related keywords useful (e.g. "subway", "city", "street", or "India"): while they yielded several posts that were not playful at all, they also allowed us to find posts that had not been intentionally portrayed as playful by the authors but still featured spontaneous forms of playful engagement. Additionally, we also found that location-related keywords helped us influence the search algorithm: the more we looked for posts from different parts of the world, the more diverse the search results were, even when using non-location-related keywords.

**The different affordances of different social media platforms.** By searching posts on Instagram, TikTok and YouTube, we noticed that the content shared on these platforms can be quite different. On Instagram, we saw both performative posts that had been carefully staged to show an idealized version of reality and others that spontaneously documented a playful situation as it emerged in the wild, without much curation by the author. On TikTok, posts were generally more performative—yet, they often were much less carefully staged than on Instagram. Finally, on YouTube, content often showed pre-meditated situations where people met and agreed to do an activity that brought about playful engagement, e.g. flying a drone in challenging ways. Designers might want to reflect on these differences, both when making the choice of where to look for posts and when using the resulting collection. We also saw that, in some cases, the same platform can feature different modalities of post whose different qualities are used differently by users, e.g. Instagram stories tend to be much

more spontaneous than regular posts. Unfortunately, though, it is challenging to access them as they are ephemeral (i.e. it lasts 24 hours) and cannot be searched (i.e. they cannot be searched on a search engine). It might be interesting to find ways of allowing designers to access stories and leverage their spontaneous content, including mechanisms for users to choose how their content can or cannot be used so the process is ethical and transparent.

**Creating collections and finding recurrent play potentials.** One of our main struggles with finding recurrent play potentials in our collections of social media content was to cluster the posts with a focus on their playful essence. Too often, our natural impulse was to cluster them using other, more objective criteria such as: setting (nature, street, household...), type of activity (sports, art, game...), utilitarian function (health-related, educational, activism...), or age group (children, adults, teenagers...). Yet, clustering posts based on those criteria did not help us surface what was fun about them—rather than uncovering their playful potential, it distracted us from it by putting other variables at focus. I argue that, to find play potentials in social media content, it is important to approach a collection of posts with a focus on what makes these situations playful, centering the designer’s attention on aspects that can inspire play design. When using the collections, we also struggled with handling large sets of social media posts. We used different strategies to do that<sup>17</sup>. For example, in the urban technology project, we used a spreadsheet to store, coded, and discussing the play potentials. While that system allowed us to have all the posts on a unique list and annotate our interpretations (e.g. adding notes indicating the play potentials represented by each post), we could not include the actual audiovisual content. Every time we wanted to access that content, we had to manually click on the link and open the post in a new tab—a process that was not helpful. We

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<sup>17</sup> Link to the Google Drive spreadsheet: <https://bit.ly/39uOmqV>. Link to the Trello board: <https://trello.com/b/9p90eAzM>. Link to the Instagram story highlight: <https://bit.ly/3EBn1ls>. Link to the Pinterest board: <https://bit.ly/3eka6bj>.

concluded that spreadsheets might better support analytical rather than designerly thinking; they are better suited for interpreting the data than for making inspirational use of it. In the playful drones project, we tried another three tools: We began by exploring the collection of posts to find recurrent playful patterns. Then, we used Trello to bring together these early patterns and further develop them: we created a card for each theme we saw in the data, then clustered those play potentials in different ways until a set of design directions emerged. Trello allowed less meta-information, but it enabled us to easily move the different posts around a digital board and cluster them in groups, which helped a lot in our coding. Again, though, we determined that mechanism was more useful to support analysis than to inspire. In response, we created an Instagram story highlights collection to bring together several posts together into a visual collection and curate it with meta-information that helped viewers understand the key play potentials. That mechanism was more useful from an inspirational perspective: it allowed the viewer to quickly get a general idea of what could be learned from the collection of posts. Yet, navigating the data in detail was not straightforward; Instagram story highlights present all the posts linearly and show only a part of their content, so viewers must exit the collection to see the details of each post. As such, that mechanism might be a useful tool for communicating the general inspirational points of collection of posts but might not be the best one for digging deeper into a collection. To enable designers to do that and make inspirational use of posts in all detail, we finally brought all of them to Pinterest. We created a series of boards, each one featuring posts relevant to each of our play potentials. That allowed us to make designerly use of the collection: it enabled us to pick play potentials, open the related boards, and slowly examine several posts that exemplified how those play potentials looked like in practice—which greatly supported our ideation.

Building on the learnings above, here I provide actionable recommendations to designers interested in chasing play potentials in existing social media content:

- Before re-posting content from other accounts, designers should ensure they adhere to data privacy regulations. Based my experience with IRB regulations in the US, if the original post was published in an open account, it can be re-posted freely; else, there is a need to secure consent from the author, and from any third parties featured in the post if identifiable information is displayed.
- Social media search algorithms tailor search results to people's interests. Designers should take that into account, both when collecting posts and when interpreting them. They can work around those biases by using different accounts, owned by different people, to collect posts; or by creating new accounts that have no prior record of preferences the algorithm can use to tailor the search. Designers can also leverage the algorithm to their advantage: the more they look for a type of post (e.g. playful or culturally diverse ones), the more the search results will steer in that direction.
- When searching posts, keyword choices are important. Using not-so-obvious words (e.g. "haha" or "sofunny" instead of "playtime" or "fun") will help designers find more spontaneous, less staged posts. Location-based keywords (e.g. "street" or "Europe") are also helpful; they train the algorithm to provide culturally diverse content.
- Different social media platforms tend to include different kinds of content. Instagram generally includes either very staged posts or spontaneous and unfiltered accounts of mundane activity; TikTok includes highly performative posts, but more playful and less carefully crafted than Instagram; YouTube often includes recordings of situations where people met and agreed to do a pre-meditated activity. Generally, most social media posts are quite performative, and in occasions even staged—that needs to be considered when interpreting the play potentials distilled from them.
- When exploring a collection of posts to find playful inspiration, designers should focus on what makes them playful. They can pay attention to other variables (e.g. context, type of activity, age group) later, if necessary.

- Different platforms afford different tools for making inspirational use of a collection of playful social media posts. Spreadsheets can help designers bring together, interpret, code, and add meta-data to posts; Trello's card functionality is useful for creating lists of codes, i.e. to find recurrent play potentials. Instagram stories allow the creation of highly visual compilations that provide a quick glimpse of the diverse play potentials represented in a collection. Pinterest allows the creation of play potential boards that enable viewers to dig deeper into the details of posts related to a play potential.

#### **7.2.4. The potential and limitations of social media tools to chase play potentials**

The work presented above shows different ways in which social media can help designers to uncover emergent forms of playful engagement that are meaningful to people. Social media can support designers to identify, capture, and empathize with a series of mundane situations where people behave playfully—situations that they may not be able to access without the support of those tools. Building on my Situated Play Design proposal, I argue that this can be a really valuable asset in the design of playful tech targeting everyday contexts and activities.

As described in 7.2.1, the purpose of this methods research was to explore generative [112] social media-based strategies to do research for design [99], focusing on inspiring ideation rather than on validating hypotheses. As such, the strategies presented above will likely yield subjective, interpretive insights. Like other design methods, e.g. “cultural probes” [105], the potential of this approach does not lie in generalizability—rather, it provides contextually and emotionally rich information that can help designers empathize with stakeholders. That was a very useful move in my work: it enabled me to produce ideas that built on playful practices people already enjoyed in their daily lives (see, for example, Chapter 6). It helped me to find a “way into” people’s lives and their ordinary activity—to sensitize myself to, and draw inspiration from, people’s existing playful practices. The data collected through this approach

can often be ambiguous, and the ways of using it open-ended. Far from being problematic, that ambiguity can be productive in design [112]: it allows designers to make creative use of inspirational material through the lens of subjective interpretation. That sets the strategies described above apart from existing uses of social media in HCI (e.g. [71][129][204][234]) which are more focused on producing robust and validated research outcomes. That does not mean social media does not have the potential to support HCI scholars to produce generalizable knowledge—that is just a different agenda than the one behind my work.

One of the key limitations of using social media for play design purposes (and for that matter, for design research in general) is that it might not always offer a representative view of reality. Not all demographics are equally represented on social media and, as such, certain forms of playful engagement will never be featured in a resulting dataset, however relevant. Therefore, the play potentials we find on social media may not always be representative of the general population. Yet, as much as it might not offer a complete picture of reality, my experience shows that this approach can help to enlarge the set of stakeholders included in a design project: First, social media makes it logistically viable to pay attention to stakeholders we are not able to access physically. It empowers us to embrace the idiosyncrasies of different cultures and communities remotely, in ways that would hardly be possible in-person. Second, it can help us work around exceptional circumstances that make it temporarily challenging to engage stakeholders in person, even if they are not geographically distant. An example is the COVID-19 pandemic: in my work, using social media allowed me to do situated work in times when I could hardly have access to stakeholders and their ordinary contexts.

As much as I found social media to be a useful play-chasing tool, I also realized that existing platforms have limitations when it comes to facilitating this kind of work. Here I provide some suggestions for social media providers interested in further developing their platforms to respond to the needs of playful design and research: To facilitate the task of documenting

emergent playful situations in the wild, it would be very helpful that designers could add filters to photos and videos to easily anonymize them. Ideally, those filters should still display people's facial expressions (e.g. through a cartoon face), as they are important to understand and convey playful situations. For videos, filters should be dynamic (e.g. an animated face) to capture interactions and not just a still image. It would also be useful if animated gifs, which are currently only available on Instagram stories, were also available when editing regular posts. Animated media represent interactions much better than still images; gifs can be used to create collages on top of original photos to better represent the dynamic nature of play potentials. Finally, it would also be helpful if social media tools allowed browsing and filtering an account's content by hashtag, to facilitate finding posts that related to concrete design projects—as described in 7.2.2, the browsing through the content of the @chasing.play account without filtering posts was challenging.

I also have suggestions to better support designers to sensitize themselves to other people's playful practices by exploring their social media posts. On Instagram, regular posts can be searched using the search engine (if made public by their authors). Instagram stories cannot. It would be useful to have similar access to them, as it is often where people post the most raw and unfiltered accounts of their daily lives. To ensure ethical practices and the respect of people's privacy, social media providers should include a transparent mechanism for users to state whether they want their posts to be used for design/research purposes, and how. That mechanism should allow users to make specific and informed choices, e.g. making content available for non-commercial research only, or requiring designers to de-identify their data. Over time, that might help people feel more ownership of their data and trust more that designers would use it ethically. Finally, I struggled with bringing together the posts we collected from different social media platforms (e.g. Instagram, TikTok and YouTube) into a single collection of playful posts. That made my process of identifying play potentials much

harder. It would be useful if social media platforms better supported the different processes of reading, clustering, and making inspirational use of a collection of posts, as described in 7.2.3. Ideally, those functionalities could be integrated into one single platform; alternatively, there could be an easy mechanism for transferring posts and their meta-data from one platform to another—relieving designers from having to transfer posts manually.

### **7.3 Designerly Tele-Experiences: a remote, multi-stakeholder co-design method for playful speculation**

Here I present a method that addresses another methodological challenge associated with SPD: it is hard to facilitate future-oriented co-design processes where people discuss the experiential texture of a technology rather than its technical limitations, utilitarian function, or larger impact on society. That challenge is even greater when those engagements cannot be done in-person, a situation I faced in my own work. When the COVID-19 pandemic broke out, I was in the early stages of the project presented in Chapter 5—where it was important for me to co-design with stakeholders in-the-wild, in scenarios and activities relevant to my design goal. Due to the social distancing scenario, I had to quickly pivot from in-person to remote engagement, which compromised my ability to embrace a situated approach. I reviewed existing co-design methods to see how they might help me to engage people remotely and, though I found several of them inspiring none directly applied without needing refinement.

In this section, I introduce the “Designerly Tele-Experiences” (DTE) method that emerged from my exploratory process of responding to the sudden challenges I faced when trying to co-design playful technology during the pandemic. DTE takes the form of multi-stakeholder co-design sessions where participants experience early prototypes as a provocation that helps them to familiarize with the targeted design space and contribute novel design ideas. Through DTE, remote designers can create and enact lo-fi speculative technologies and

make them available for co-located participants to experience and creatively disrupt. By experiencing those half-baked prototypes in-the-wild, stakeholders get an embodied idea of important design qualities in a design space, which enables them to build on their own lived experience to contribute new design ideas. The DTE methodological proposal was submitted as a full paper to the ToCHI journal in July, 2021, and is currently under review.

DTE stems from and was refined through 13 design engagements in which I specifically studied adaptations to elements of existing situated co-design methods to engage researchers and designer participants in physical and digital design activities and dialogues (see Chapter 5 for details). I present the outcomes of that process as an adaptable starting point for conducting remote-yet-still-situated co-design in ways that enable play-focused and speculative ideation. DTE is an early strategy and set of actionable insights that can guide other designers who want to embrace situated and participatory approaches in their own work, even when in-person engagement is not possible or desirable—which I believe might be useful during but also beyond the pandemic. I hope my contribution provides direct, actionable inspiration to designers doing similar work to mine, and that it contributes to an ongoing (and necessary) discussion about how to do remote-yet-still-situated co-design.

### **7.3.1. Existing methods relevant to speculative, playful, and remote co-design**

Importantly, the DTE method does not address remote co-design as a whole, nor does it seek to substitute for or diminish the value of existing methods. Rather, it presents a technique I created to respond to the needs of a design project where I experienced a lack of tools to conduct remote playful co-design. My proposal focuses on a specific part of playful interaction design: engaging users as co-designers and empowering them to co-experience, speculate upon, and further develop early playful design ideas. In the case study described in Chapter 5, I struggled with a lack of strategies that helped me to do that remotely—especially

because my goal was to empower stakeholders to not only respond to advanced ideas but to participate in the development of early concepts as co-design partners. When the pandemic broke out and my plans for in-person co-design were disrupted, I reviewed existing methods to see how they might help me to do remote-yet-still-situated co-design. I found inspiring ideas that could potentially address some of my needs; yet, I could not find methods that addressed all my requirements at once, without modification. Here I outline my requirements and how aspects of existing methods inspired me to develop a new strategy to address them.

First, I wanted to engage stakeholders “in-the-wild” [202], to keep the idiosyncrasies of their contexts at the forefront of conversations. Several methods support in-the-wild design work, e.g. workshops occurring in naturalistic settings, such as “labs in the wild” [249]. Though I was inspired by their designerly use of the spaces and activities targeted by the design project, these workshops require co-located participation, which renders them impractical in remote scenarios. Other methods overcome that challenge by freeing designers from engaging stakeholders in person, e.g. “diary studies” [219] and “design probes” [35] prompt participants to collect information about their daily actions on their own and send it to designers. However, these methods are often used for other purposes than ideation, e.g. “cultural probes” [105], are used to collect contextual data that helps designers empathize with users (i.e. to inspire design). Moreover, none of these methods facilitate direct and scaffolded interaction between designers and stakeholders. This was at odds with my aim of anchoring the research to the immediate social context and engaging stakeholders directly to collectively imagine, rethink, and iterate on design ideas.

I also wanted to facilitate iterative co-creation between designers and other stakeholders, empowering the latter to not only provide information or test advanced concepts, but also (and especially) to contribute to making important design choices. Myriad interaction design techniques can be useful to stimulate collective ideation. Embodied design methods, e.g.

“object theatre” [205], “embodied sketching” [165], or “informance design” [48] use people’s bodies as a prototyping material to enable them to co-imagine new technologies and explore how they may pan out in practice. While it is true that embodied design methods can be used individually, they have a lot of potential when they are used to ideate in a group and in a shared space [130]. Multi-stakeholder co-design methods stimulate those collective ideation processes, e.g. “design collaboratoriums” [49], “dialogue-labs” [162], or “Design:Labs” [31] use the affordances of shared spaces and materials to enable co-creative engagements where diverse actors collaborate towards a shared design goal. However, both embodied and multi-stakeholder methods tend to rely on in-person interaction, which challenges remote implementation. Gaver et al. have experimented with a different, DIY-inspired approach where people independently build their own prototypes, without any intervention by designers other than a suggested guide for building them [114][137]. My proposed method builds on this rich tradition of embodied and multi-stakeholder co-design techniques and makes their affordances accessible remotely. I also build on other methods like “provotypes” [36]: provocative prototypes that, when experienced, will trigger a response that can be leveraged to investigate both desirable and undesirable design choices in a particular design space. “Provotypes” are remarkably versatile: they can be used in-the-lab or in-the-wild, with or without the presence of the designer-facilitator—an important quality that inspired my work.

In my project, it was also important to enable stakeholders to experience “for real” early and future-oriented design ideas, even before a polished prototype had been developed. A plethora of existing methods support the creation of “half-baked-yet-still-experienceable” prototypes that are malleable enough to enable quick, in-situ, and spontaneous modifications, e.g. “object theatre” [205] uses enactment to support rapid mocking-up, experiencing, and modification of design concepts. Yet, these methods’ co-located nature challenges remote implementations. “Wizard-of-oz” [68] can also be useful for co-experiencing believable

versions of in-progress tech ideas: they allow designers to “fake” functional prototypes and create an illusion that they work. Though wizard-of-oz is often used in advanced phases of design (e.g. to explore the impact of an existing prototype or to polish it), it has also been used in earlier stages of ideation, e.g. as a sketching technique [51] or to “present users with rough sketches of interface ideas, even when it’s unclear what the underlying technology should be” [84]. Here I build on prior works that have employed wizard-of-oz in early ideation stages, as well as on those that have implemented it remotely [169][236].

In my project, it was also important to enable stakeholders to experience and contribute to shaping futuristic design spaces. The ideas I was working on (e.g. a technological tablecloth or a smart cutlery set) are out of the scope of what most people commonly interact with in their day-to-day. “Design fictions” [235] can be a useful technique to expose co-design participants to futuristic technology: they immerse them in fictional settings and help them to project what it might mean to experience those unfamiliar scenarios. “Design workbooks” [111] have also been used to engage stakeholders to co-design building on an existing, early ideas. Other relevant works, e.g. [43]’s “Future IKEA Catalogue” or [252]’s speed dating-inspired “menu of possible futures”, have employed narrative and visual design to trigger people’s imagination and empower them to think about how they might relate to a novel technology, or to critically reflect on how it might impact their lives. Others have taken a more experiential approach: [175] uses VR to support “immersive design fiction” experiences that give people an embodied and experiential sense of the implications of futuristic tech; [61] builds on the interactive affordances of videogames to enable co-design participants to explore speculative futures; or [90]’s “speculative enactments” and [53]’s “experiential futures” use prompt people to enact and experience futuristic scenarios in ways that the emergent speculations feel meaningful to them. I was inspired by how those methods immerse people in speculative scenarios, and help provide them with a believable experience

of their implications, as a result empowering them to contribute insightful design ideas. My DTE proposal builds on those methods by exploring how those kinds of speculations can be facilitated remotely, to support collective decision-making early in the design process, when ideas are still at an incipient stage. I was inspired by “Breaching experiments” [62] too, which can be used to observe existing rules regulating people’s contexts and explore how confronting those existing practices with novel technology might impact them. From breaching experiments, we can learn how to investigate the social circumstances relevant to technologies that do not yet have a place in people’s lives and for which, consequently, people have not yet developed commonplace practices.

Finally, another important requirement in my work was to focus people’s attention on the moment-to-moment experience afforded by technology. My aim was to explore the socio-emotional potential of mealtime technology, rather than its utilitarian function. As such, I wanted to encourage stakeholders to focus on their playful and experiential preferences rather than on pragmatic requests—to carefully craft the experiential texture of technology ideas, in ways that resonated strongly with their playful desires. Existing methods can support experience-focused co-design, e.g. the range of experiential approaches to design fictions described above, or my “play & culture workshops” (see Section 7.1 or [12]), which center participants’ efforts on exploring the playful potential inherent in real-life scenarios as a starting point for ideating interventions that help to realize that potential. Though inspiring, these techniques rely on bringing people physically together to co-imagine, -experience, and -iterate on ideas. As such, I had to adapt them to fit the needs of remote scenarios.

Though inspirational, existing methods do not respond fully to the challenges I was facing: How can we engage stakeholders in-the-wild? How can we enable them to co-experience early, futuristic ideas without using polished prototypes or existing tech as a reference? How can we co-design and iterate (rather than inspire or evaluate) ideas? How can we center on

the experience afforded by tech, rather than its technical requirements, utilitarian function, or societal impact? And how can we do all of that, in combination, when we must engage stakeholders remotely? To respond to those questions in ways that supported my work, I created a new strategy inspired by a combination of existing methods. I formalize it below.

### **7.3.2. Formalizing the Designerly Tele-Experiences method**

“Designerly Tele-Experiences” (DTE) are multi-stakeholder co-design sessions where people experience early design ideas as provocations that help them to familiarize themselves with a targeted design space and contribute novel design ideas. Through DTE, remote designers enact lo-fi technology provocations and make them available for co-located participants to experience and creatively disrupt. By experiencing those half-baked prototypes in-the-wild, people get an embodied understanding of important design qualities in a design space, which enables them to build on their own lived experience to contribute new design ideas. DTE combines strengths of existing methods to support remote co-design that is still situated and embodied: designers participate remotely through a video call, but stakeholders are co-located and, as such, they can co-experience, -discuss, and -ideate in an embodied and contextually meaningful ways. Here I formalize the DTE method, synthesizing key aspects of the process I followed in the design project described in Chapter 5. Further details about that process can be found in Sections 5.4 & 5.5. Figure 54 synthesizes the DTE method visually.

DTE is a flexible approach that can be adapted to the idiosyncrasies of the stakeholders and activities that are relevant in each design project. Rather than a strict set of rules, it is an inspirational starting point for engaging stakeholders remotely while still doing situated co-design work. Even in the case study that served as a testbed for developing it, I adapted my process along the way to fit my needs as the project kept advancing; for example, see Section 5.5 where I describe how I modified some of the early prototypes along the way

responding to my ongoing learnings from the co-design engagements with stakeholders. To make DTE actionable and empower designers to appropriate it, here I provide early (and malleable) guidelines based on the experience I got from using it in my work:

**Step 1: Begin with in-house ideation grounded in play potentials identified in the wild.**

To use DTE, the first step is to do contextual research and identify important design qualities we want to explore with stakeholders, e.g. through interviews, ethnographic observations, cultural probes... Once a series of foundational design qualities have been defined, designers can generate early ideas that embody a broad range of those qualities. The resulting collection of concepts should characterize the targeted design space and as many relevant design directions as possible. At this stage, ideas should not be precise or complete; rather, they should be deliberately diverse, ambiguous, and unresolved, so that stakeholders can engage with the directions they feel most interesting and appropriate them creatively.

**Step 2: Make a catalog featuring the early ideas and plan how to prototype them.** Once a pool of early ideas has been generated, designers can make a catalog that gets people excited and helps them to relate to the targeted design space. Rather than being technical or academically rigorous, the catalog should be plain and simple—even commercial-looking—so it helps people to emotionally connect with the tech ideas and project how they might impact their lives. Descriptions of ideas should be short and open so people can begin to fill the gaps. To prepare for the co-design sessions, designers should create wizard-of-oz inspired “provotypes” that allow for the improvisation and enactment—see Section 5.5 for examples. Ideas should not be fully fleshed out: they should be malleable and ambiguous so they can be experimented with during the co-design sessions. Prototypes should not look like polished products either—it is better people think of them as incomplete proposals they can disrupt. However, interactions afforded by prototypes should feel real; otherwise, it might be too hard for people to get a good experiential understanding of the core aspects of the tech ideas.

**Step 3: Reach out to stakeholders.** In DTE, the recruitment strategy is as important as the co-design sessions themselves: in my experience, producing a catalog of speculative concepts, sharing it on social media, and holding informational video calls played a critical role in facilitating fruitful engagements with participants. Once the catalog is ready, designers can distribute it through channels that feel natural to the relevant stakeholders, e.g. on social media. To elicit curiosity and persuade people to get onboard, designers can share some of the ideas as teasers, inviting people to reach out if they want to see the full catalog.

**Step 4: Schedule a video call to get participants involved.** When stakeholders show interest in seeing the catalog, designers will benefit from not simply sharing it with them. They should also invite participants to one-on-one video calls where they can (1) describe the project, (2) allow people to talk about their perspectives on the early ideas, and (3) invite them to participate in a co-design session. At this stage, designers will likely need to ask participants to recruit a group of their acquaintances to partake in the co-design session. It is important to provide them with guidance for how to do that.

**Step 5: Conduct the Designerly Tele-Experience.** The last phase of DTE is the actual co-design session, which will typically take the form of a ~2-hour video call where one or more remote designers engage a group of co-located participants to talk about ideas in the catalog, experience one of them in context, and co-imagine how to modify, extend, and rethink that idea. These sessions consist of three parts: First, a brief conversation where designer(s) will describe the project and answer people's questions (~15 minutes); Then, a playtest of one of the early technology ideas, where designer(s) will disappear "behind the scenes" to operate the prototype while participants experience it within the context targeted by the design project (~1 hour, depending on the context/activity); Finally, a conversation where participants will discuss their experience of the prototype and use it as starting point to ideate how to further develop the technology idea or co-design new ideas from scratch (~30 minutes).

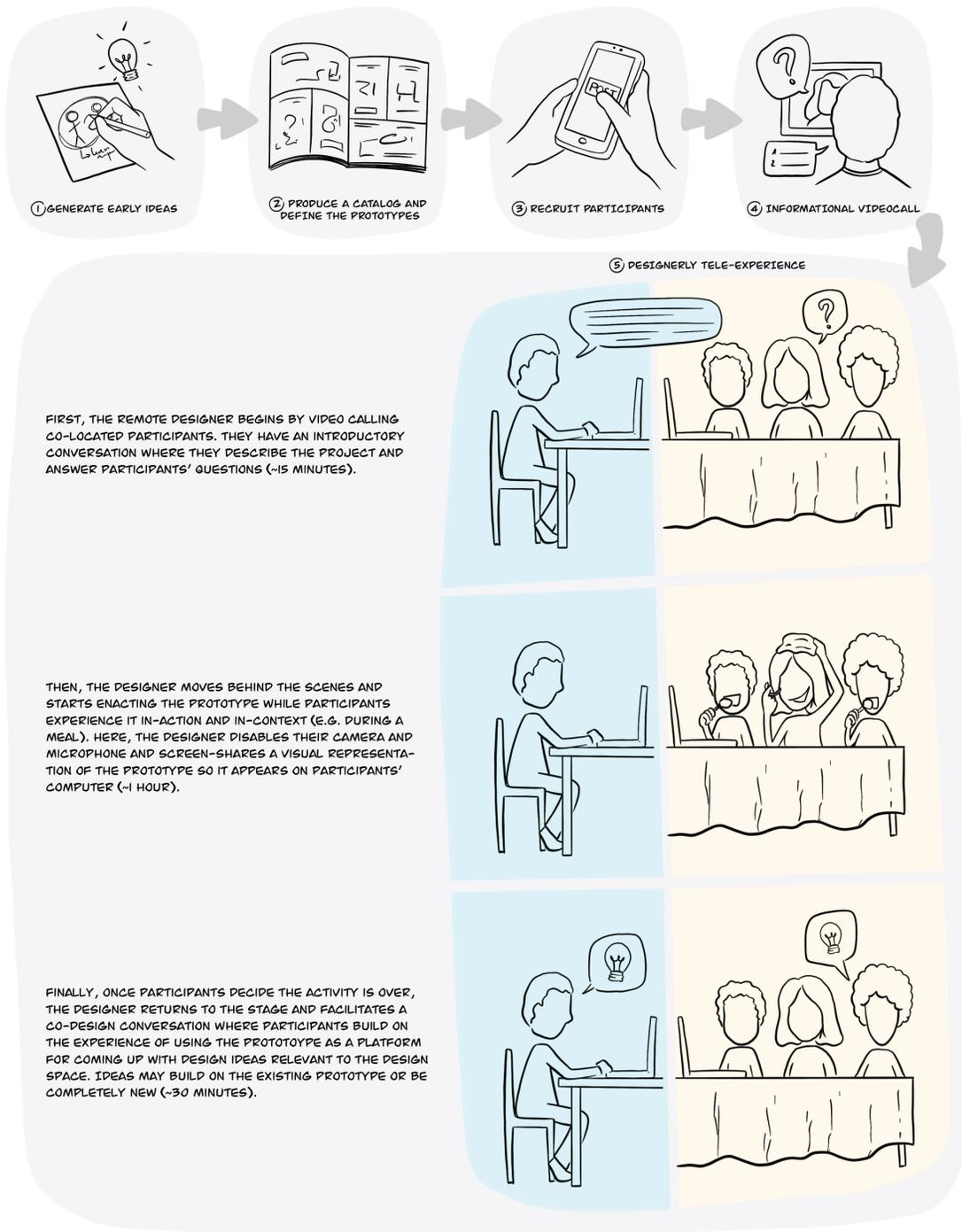


Figure 54. Summary of my early and flexible guidelines for using Designerly Tele-Experiences.

### 7.3.3. Learnings from implementing DTE

The guidelines above synthesize the methodological choices I made in the Chapter 5 project and formalize them into a set of guidelines. To make them more actionable, here I share reflections from implementing DTE in my own work. Using a post-positivist approach with reflexive thematic analysis [40][41], my research assistants and I documented and reflected on our process, engaging in an ongoing process of meaning making through a combination of individual self-reflection with a series of de-briefing sessions where we collectively discussed our thoughts. We also factored in people's comments at the end of the co-design sessions, to contrast, challenge, and extend our own ideas. Here I present the resulting insights, hoping to inspire other designers to implement DTE. Some of my findings resonate with ideas that have already been brought up in prior design research. Rather than claiming them as novel, I present them as insights that can guide designers interested in implementing DTE.

#### 7.3.3.1. *Early ideation and the resulting catalog*

**The catalog got people excited and helped them to relate to the targeted design space.** Sharing on social media got people's attention and made them curious to see the full catalog. Once they got it, browsing the technology mock-ups helped people to understand our early ideas. They seemed to easily relate to the ideas and imagine what it would be like to use them, and as a result they often responded with insightful comments—especially in the follow-up conversations over private messages and in the informational video calls. That led to a very interesting first round of feedback where we began to understand which concepts and underlying qualities resonated more, and why. In that sense, it was key that the catalog included ideas that represented different design directions: allowing people to choose from a diverse pool of concepts enabled us to explore which directions resonated more and provided participants with a feeling of agency that got them excited about the concepts they chose to

playtest. As a result, they ended up being better positioned and motivated to reflect on the experience of using those early prototypes and to co-create by building on them.

**Sharing early ideas stimulated collaborative ideation.** The half-baked nature of our early ideas fueled the co-design exchanges. It empowered us all to improvise design choices on-the-fly: us, as designer-facilitators, by enacting the prototypes; participants, as play-testers, by interacting with and making sense of them. Often, they asked about details of prototypes we had not figured out yet. For example, S8 asked if in the “Table Manners Bomb”—a table centerpiece that allows diners to call out each others’ anti-social behaviors, so they receive a punishment—they were allowed to not only call each other out but to decide custom punishments. I embraced that idea on the spot and began to listen to punishment proposals, both orally and via WhatsApp. That led to hilarious situations where people tailored punishments to their prior history, e.g. someone suggested “combing hair” as a punishment when she called out another participant who had recently shaved his head—for which he was often teased. Far from being problematic, the fact that we had not figured out these kinds of details from the onset was productive: it allowed us to embrace people’s emergent ideas on the spot and to incorporate them into the malleable, enactment-based prototypes.

#### *7.3.3.2. Recruiting participants*

**Scheduling informational video calls helped to get participants onboard and establish a relationship of trust.** In earlier phases of the project, I saw participants got overwhelmed when I sent long instructions they had to make sense of on their own. Many decided it was too much and communication was lost; I did not even get a chance to help them to digest the information and make participation less intimidating. Learning from that, in the co-design phase I scheduled one-on-one video calls with participants to deliver instructions myself. That increased the retention rate: all participants who attended a video call ended up following

through, except for three who could not due to personal circumstances. To compel people to attend the video calls, I found it useful to show only 2-3 of the designs in the recruitment messages: that made people curious to see the rest of the catalog and talk to us about it. The video calls brought about another positive effect: they allowed us to better understand which ideas resonated more and why; people were often talkative about their opinions. E.g. we learned that S6P2 liked “PlaceMap”, “Table Manners Bomb”, “FoodLand”, “Anxious Plates”, “Screen-ED”, and “Sassy Cutlery”, but thought that the latter two would only be interesting in very special occasions, like in meetings with friends. Further, we found that allocating time for quality conversation with participants helped to establish a relationship of trust with them: participants in S2, all of them strangers to us, said they felt comfortable with participating because they could talk to us before the co-design session and confirm that we were “good people with good intentions” (S2P4). It allowed them to “vet [us] and get to know the person behind the research” (S2P3). That reinforces my idea that allowing early opportunities for quality personal interaction plays an important role in remote speculative co-design.

**Using social media to recruit participants can be a double-edged sword.** Social media helped to make people excited about our early design ideas. By featuring the catalog on platforms people often used on a daily basis (e.g. Instagram), we brought our work to their ordinary domain. We were not simply asking if they wanted to take part in our research; rather, we shared a set of intriguing ideas that made them curious and compelled them to know more. As a result, many became genuinely interested in our work. Recruiting through social media had another consequence. Most participants were part of our personal and professional networks; we had existing relationships with them. That could be problematic due to issues of bias in convenience sampling, e.g. some participants might not give negative feedback due to fear of damaging our personal relationship. Yet, we could use that as an advantage: we built on our existing relationships of trust to interpret their contributions better,

which in turn made it easier to engage them, to help them feel comfortable with being honest, and to interpret their contributions through the lens of our shared history. An example of the level of honesty we established with some participants is S6P2, who said she initially thought our work was “bullshit”; or S1P1, who called “Anxious Plates” a “scary” and “dangerous” idea. Working with acquaintances created another tension: it bridged the personal and professional spheres of our lives. Often, we felt awkward about inviting them to use their time in our co-design efforts, fearing they might get fed up with it and project that on our relationship; we also avoided certain actions when enacting the prototypes, to avoid making them feel uncomfortable (see 7.3.3.3 for an example). The tensions emerging when blending our roles as designers and community members have been explored in-depth in participatory design and participatory action research, e.g. [87][174]. Designers should pay attention to those issues when engaging stakeholders they already know, which will likely happen in DTE.

#### *7.3.3.3. Co-design sessions*

##### **Having a chance to experience early prototypes stimulated people’s creative capacity.**

Playing with the prototypes allowed participants to relate to our ideas in an intimate way. That impacted their understanding of the targeted design space and the design qualities that might be worth pursuing. For example, S6P2 said that, when she first learned about our research, she thought our work was “bullshit”—she could not see the value of exploring how to design technology that playfully enhanced her food experiences. However, after experiencing one of our ideas, her views changed: she said she loved how the prototype enriched her mealtime, and that going through that experience helped her to empathize with the motivations behind our work. Allowing people to experience early design ideas “for real” can empower them to better connect with and contribute to a co-design process in ways they might not otherwise be prepared to—an especially relevant asset in speculative, future-oriented projects targeting novel or unusual design spaces. Playing with prototypes that “felt real” helped participants to

engage both critically and creatively with our work. They did not only get the experience of using a seemingly real technology; they became active design partners who contributed to further developing early ideas and even envisioned new designs. Their contributions had varying levels of complexity, ranging from minor changes meant to polish our existing designs (what [39] calls “small decisions”) to more substantial changes that challenged foundational aspects of our original ideas (i.e. “big decisions” [39]). For example, S4 suggested that it would be great that “PlaceMap” allowed them to connect with players in other parts of the world who were concurrently experiencing the same tradition—something we never considered before; S7 improvised an emergent mechanism to choose when “PlaceMap” sent prompts, transforming a prototype that originally made its own choices into one that acted upon the diners’ request; or S9 proposed rethinking “PlaceMap” into a table centerpiece that did not involve phones or any other kind of personal device—an idea that challenged the original concept of distributing playful food traditions to people’s phones. These examples show that, while participants’ ideas built on our early design concepts (which in turn built on the findings from our play-chasing work), they often challenged our original assumptions. We empowered and encouraged participants to act as co-design partners at full right if they wanted to: while some only contributed minor suggestions to existing ideas, others took a more active stance and proposed new concepts we had not thought of before.

**Though half-baked, the prototypes delivered the intended experience—but only when they reflected real interaction patterns.** Rather than just hinting at what the experience was supposed to be, the prototypes enabled participants to feel like the experience was real—even if they were half-baked and unpolished. Some participants “had more fun than [they had] expected” (S4P1); for others, the experience was “overwhelmingly fun” (S12P1). Generally, they got the real experience even if the prototypes did not look exactly like our catalog suggested. However, some our prototypes failed: in particular, it was problematic

when the mechanisms for interacting with the prototype were considerably different from those described in the catalog. For example, to prototype “Screen-ED”—a concept where phones detected when their owner was using them, to automatically project a silly image on their face—we asked people to take pictures of each other once they saw someone using their phone, and to send them to us via WhatsApp. Then, we screen-shared those images to their computer and edited them in funny ways. That interaction mechanism was different from the intended experience, and that made it hard for people to relate to it. Learning from that, in subsequent sessions we brought the prototype closer to the intended interaction: we asked participants to stage a photo of each of other using the phone and send it before the meal; during the meal, we monitored when they used their phones, and automatically displayed their edited photo via screen share. That way, people no longer had to police one another (and take photos about it) during the meal—technology already took that role, like in the original concept. The new prototype worked much better: people engaged more with it, even if the silly image was not displayed on people’s faces (as should be according to the catalog) but on a computer screen. Another prototype where we failed to get the affordances right was “Sassy Cutlery”, a set of smart cutlery that react to people’s actions by making sounds and talking to them. In this concept, as opposed to the others, we originally decided not to wizard-of-oz the technology ourselves; we asked our participant-ambassadors to download a sound bank app and use it to enact the prototype, i.e. it was a diner, not us, who was played sounds in response to people’s interactions with cutlery. That prevented that participant from being part of the experience: they were too focused on using the app, which distracted them from both the food and the social situation. From those cases we learned that, to allow people to experience early technology ideas “for real”, it might not be problematic that prototypes do not look exactly like the finalized product would. In “Screen-ED”, the experience was not compromised by the fact that we displayed funny edited photos on a computer screen instead of projecting them on people’s faces; or in “PlaceMap” participants enjoyed communicating

through WhatsApp instead of a dedicated app. What we found to have a negative impact on the co-design potential of the experience is the inaccuracy of the interactions involved: participants should be able to interact with and through the technology in ways that resemble the interaction mechanisms in the original concept, or else the momentum might be lost.

**Being remote allowed us to disappear “behind the scenes” when necessary.** When participants experienced the prototypes, they could generally abstract themselves from the fact that we were present, in ways that might not have been possible had we been there in person. Knowing that we were operating the prototypes behind the scenes did not seem to dissuade them from enjoying the meal wholeheartedly (e.g. see Figure 55) and creatively experimenting with the prototype. Being able to, as facilitators, move behind the scenes during the meal contributed to that success. In fact, one of the prototypes was operated in plain sight and that hindered people’s engagement. As described above, when playtesting “Sassy Cutlery” (S13), it was one of the diners who operated the prototype. Unlike us, that diner could not move behind the scenes: they were physically there, and others could see their operations. That impacted the other diners’ experience of the meal and prototype; it made it hard for them to let go and submit to the experience, to a point that they often blamed the person who operated the prototype for their way of doing it. In retrospect, we realized it might have been better to operate “Sassy Cutlery” ourselves, behind the scenes, playing sounds from our computer and sharing them via video call like in the other prototypes.



Figure 55. Situations where people submitted to the prototype wholeheartedly. Left: someone holding her cup with her elbows, motivated by “PlaceMap”’s prompt of drinking in challenging ways (S6). Center: an improvised marker-tattoo someone received as a punishment from the “Table Manners Bomb” (S8). Right: participants sitting upside down on their couch, responding to “PlaceMap”’s prompt of using the space in an unconventional way (S4).

**Enacting prototypes allowed us to treat tech as yet another stakeholder**, experience what it meant to act in the ways it would, and get an in-depth idea of the stakes of the choices it was supposed to make. Because we enacted the prototypes (and participants knew it), we did not simply make them work; we “were” them. As such, we felt accountable for what they did, e.g. in “PlaceMap” we often felt a sense of responsibility when deciding which traditions we sent to participants: “Should I really send this? What will they think?”. We experienced the technology’s actions intimately, as if they were our own; that gave us a closer understanding of how interfering in people’s mealtime might or might not be appropriate and fun. Enacting prototypes also helped us to read participants’ social cues and add nuance to their post-meal reflections. E.g., S4 said they might want a conversation topic to be over before “PlaceMap” sent a new prompt—yet, we observed they often enjoyed changing topics if the new prompt was relevant to something they had just done or said. Enactment also helped us to play with the flow of the event: we could dynamically adjust the tone and intensity throughout the meal.

#### **7.3.4. How does DTE extend existing methods, and how can it help designers?**

Designery Tele-Experiences address several methodological challenges that emerge in remote co-design—all of which I experienced in my own work. First, they allow us to engage stakeholders remotely yet still in-the-wild: stakeholders are co-located and in context, while designers engage them through a video call. As such, DTE enables people to co-experience and co-imagine in embodied and situated ways, which in turn empowers them to contribute to further developing ideas rather than only evaluating advanced proposals. DTE also allows designers to deploy half-baked yet fully experienceable prototype-provocations that will likely stimulate participants’ creative capacity. In my case study, that gave participants a rich lived experience they used to familiarize with an unfamiliar design space and set a solid foundation for their creative contribution. By supporting embodied, situated, and communal activity, DTE centers people’s focus on the experience of using a technology rather than on its technical

requirements or utilitarian function—an important point in interaction design projects focused on carefully crafting the experiential texture of a technology intervention. Existing methods respond to some of those challenges, but do not address all of them at once—even less so in remote scenarios. Below I unpack how DTE builds on and leverages the strengths of existing methods, extending them in novel ways (see Figure 56 for a summary).

Like “design workbooks” [111], DTE helps people relate to unfamiliar design spaces, ideas, and scenarios. It builds on embodied approaches to “design fiction” [235], e.g. “experiential futures” [53], “speculative enactments” [61], or “immersive design fiction” [175], and extends them by focusing explicitly on the experiential texture of a novel technology. DTE shares with in-the-wild co-design workshops (e.g. “labs in the wild” [249] or “play & culture workshops” [12]) and other multi-stakeholder co-design strategies (e.g. “design collaboratoriums” [49],

	In-the-wild	Focus on ideation	Experience early prototypes	Focus on experience	Remote
Labs in the wild	●	●	●	◐	○
Diary studies	●	○	○	◐	●
Cultural probes	●	○	◐	●	●
Technology probes	●	○	◐	◐	●
Object theatre	◐	●	●	◐	○
Embodied sketching	◐	●	●	●	○
Informance design	◐	●	●	●	○
Prototypes	◐	◐	●	◐	◐
Wizard-of-oz	◐	◐	◐	●	◐
Design workbooks	●	◐	◐	◐	◐
Immersive design fiction	◐	◐	●	◐	◐
Speculative enactments	●	◐	●	◐	○
Experiential futures	◐	●	●	●	○
Design collaboratoriums	○	●	◐	◐	○
Dialogue-labs	○	●	◐	◐	○
Design:labs	○	●	◐	◐	○
Breaching experiments	●	○	●	◐	◐
Situated play design workshops	◐	●	●	●	○
Designerly Tele-Experiences	●	●	●	●	●

Figure 56. DTE situated with respect to existing co-design methods and our methodological requirements (described in 7.3.1). Circles indicate the strength of the relationship between methods (rows) and methodological requirements (columns). A full circle indicates a strong relationship; half-full indicates moderate; empty indicates weak.

“dialogue-labs” [162], or “Design:Labs” [31]) a focus on co-experience as the foundation of generative ideation: it brings stakeholders together in a naturalistic setting to collectively experiment with provocative materials, and uses that experience as a platform for producing ideas that are contextually sound. As opposed to in-the-wild co-design workshops, DTE allows designers to engage stakeholders remotely—while participants are co-located in the targeted context, designers participate through a video call.

To facilitate such remote interaction while foregrounding the importance of materiality and embodied interaction, DTE takes inspiration from “wizard-of-oz” [68] (especially when done remotely, e.g. [169][236]): it allows remote designers to present co-located stakeholders with experienceable prototypes so they get an embodied understanding of the targeted design space. In particular, DTE builds on wizard-of-oz practices that focus explicitly on co-creating new design concepts, rather than testing and evaluating prototypes of ideas that are already advanced (e.g. [51][84]). Inspired by “provotypes” [36], DTE uses prototypes as provocations that enable stakeholders to experience underdefined ideas that stimulate their creative capacity and empower them to ideate. In consequence, DTE prototypes are much less robust than traditional wizard-of-oz prototypes: they are ambiguous and incomplete and, as such, malleable and easy to disrupt. They are also future-oriented (like e.g. “design fictions” [235]) and improvisational. To exploit that malleability, DTE learns from improvisational embodied design methods, especially “object theatre” [205], to enable designers to enact prototypes and improvise design choices on-the-fly, in ways that spontaneous choices can be implemented rapidly as people experiment with the prototype.

Overall, the DTE methodological proposal is not necessarily better or worse than existing methods, nor it seeks to displace or substitute them. Instead, as Figure 55 indicates, it combines many of their strengths to tackle the emergent challenge of supporting early and situated co-design ideation in remote settings—in ways that focus on and are grounded in

people's experience of a technology. As a result, DTE allows designers to tackle 5 challenges in combination: (1) engage stakeholders in-the-wild (like "labs in the wild" or "diary studies"); (2) focus efforts on co-designing, rather than inspiring or evaluating (like "object theatre" or "embodied sketching"); (3) enable participants to co-experience early, half-baked, and future-oriented design ideas without a polished prototype or an existing tech that can be used as a reference (like "provotypes" or "design fictions"); (4) center conversations on the experience afforded by technology rather than its technical requirements, utilitarian function, or societal impact (like "cultural probes" or "play & culture workshops"); and (5) enable remote exchange between participants and designers (like "diary studies" or some "wizard-of-oz" techniques).

By combining elements of such broad range of situated design practices, DTE open new possibilities for designers. In my own experience, they were very helpful to empower people to contribute to a design space that was unfamiliar to them. Although our participants could clearly be considered experts in mealtime experiences (they had been partaking in them for their entire lives), most had never been exposed to the idea of a future where their food interactions might be technology mediated. Design concepts like the ones I was after (smart cutlery, mechatronic plates, conversational centerpieces...) were simply out of the scope of anything they could easily relate to. Experiencing what it might mean to use those artefacts at mealtime enabled them to explore their own perspectives about this emergent design space. It also helped them to think from experience and not only from reason, which is arguably an important part of the generative nature of design [100][112]. That allowed participants to be both critical and creative, and to contribute interesting design ideas as a result—as opposed to simply validating advanced proposals. They engaged as design partners at full right, and that brought about ideas that I, as lead designer, may not have considered otherwise.

An important factor in unlocking participants' creative potential was the way we recruited them: the catalog of intriguing design ideas got people's attention and invited them to think

about how those technologies might play out in their ordinary lives. That gave them a feeling of agency: they could choose which concepts they identified with the most, as if they were purchasing them, and appropriate them to their own will. An important trait of the catalog and the ideas it presented is that it had little bounds with regard to technical feasibility, i.e. some ideas were based on tech that does not exist yet (e.g. “Screen-ED” was based on phone with an integrated projector). Working with such kinds of futuristic ideas has strengths and weaknesses: on the one hand, it helps stakeholders to transcend the conceptual limitations of the technologies they are used to seeing in their day-to-day, and thereby approach the co-design process through a more creative and less constrained lens; on the other hand, in certain cases it may steer people in design directions that, by being too optimistic or even unrealistic, are not necessarily relevant from the perspective of near- or mid-term design.

It was also crucial that we allocated space for one-on-one, quality interaction with our participants: it allowed us to get them excited about participating in our project and helped them to trust us and feel that it was safe to participate. That could also be seen as a weakness DTE: designing polished catalogs of early ideas and engaging participants in one-to-one conversations are time consuming tasks. Yet, my experience shows that they were key to nurturing people’s wholehearted participation in the co-design activities, which brought about interesting design ideas as a result.

Another strength of DTE is that it allows designers to treat technology as yet another relevant “stakeholder”. By enacting half-baked prototypes, designers “become” the tech and make improvised choices they will likely feel as partly theirs—that is, at least, how I experienced it in my case study. Having such an intimate experience of what it means to “be” a technology, empowers designers to understand the specific implications of making the choices that the technology would. That allows them to experiment with diverse ways of adapting the tech to interact with people in a more socially appropriate way. Further, by enacting prototypes for a

long time (we did 13 sessions, each ~1 hour long), designers are exposed to scenarios they may not envision otherwise and can identify issues they may have overlooked. DTE's capacity for enabling designers to impersonate tech could be seen as aligning with emerging more-than-human approaches to HCI and interaction design (e.g. [79][116][187]). Future work could investigate that intersection further, exploring how DTE might support processes where other subjects than humans are considered as design partners to enable new ways of thinking about human-technology entanglements as more-than-human ecosystems.

An important consideration is that, building on a tradition of generative design-led practices [100][112], DTE is deliberately open-ended. Rather than a rigid ruleset, it is a flexible set of guidelines designers can appropriate. The process described here worked in my case study, but designers should adapt it to the needs of their own work. That is a limitation of my work: DTE was developed to respond to the needs of a specific project, one where I experienced chaotic circumstances and a great deal of uncertainty. I did not experiment with DTE beyond the scope of that case study; therefore, I cannot be sure how it might play out in other cases. Though my experience makes me confident about its potential, I see a need for future work that evaluates if and how DTE might be helpful in other contexts and for other design goals.

Further, due the organic and emergent nature of the case study, I did not have a pre-defined mechanism in place for evaluating the performance of DTE as opposed to other methods. Instead, my collaborators and I reflectively built on our own experience of using it, as well as on our knowledge of related methods, to discuss its strengths and weaknesses. Rather than sharing generalized guidelines that can be readily adopted without adaptation, here I present early advice from our practice, hoping to inspire designers facing similar circumstances. My contribution does not provide a unique way of approaching remote co-design; rather, it can (1) inspire designers facing similar struggles than the ones I experienced, and (2) initiate a timely discussion about how to co-design remotely in situated and embodied ways. Despite

the experimental nature of this methods research, I see the value of sharing DTE now, when the motivations behind it are impacting designers globally. It is an opportunity to initiate a community conversation about new ways of doing remote-yet-still-situated co-design. I stress the need for future work that continues to experiment with this proposal: building upon it, enriching it through new perspectives, challenging it, and assessing its validity compared to other methods. Ultimately, I hope to spark a larger discussion about the need for new co-design methods that help us to respond to the contemporary challenges of interaction design.

Finally, though DTE originated as a response to the challenges derived from COVID-19, I argue that it might also be useful beyond the pandemic. In the case study, DTE enabled practices that might be equally relevant when social distancing limitations are no longer necessary. For example, it allowed my collaborators and I to access stakeholders from different parts of the world, intimately and in depth, without travel expenses. It also allowed us to intervene and be present in our target design scenario in ways that did not prevent stakeholders from experiencing the co-design activities as being part of their ordinary routines. I see this as a promising move both in and beyond the pandemic: it allows us to co-design in the wild while minimizing the impact of our presence on participants' choices. I believe that those and other affordances of DTE might be very relevant beyond COVID-19, and I look forward to leveraging them in future projects to further explore that potential. I also look forward to seeing how others appropriate DTE, adapting and improving it to enrich the palette of remote co-design strategies available to interaction designers.

In summary, DTE proposes a novel way of doing situated-yet-still-remote co-design by combining aspects of existing methods that, on their own, may not fully address all the challenges of remote co-design at once. I hope that this contribution provides designers with a new technique to add to their toolkit—one that I argue will help them in design projects that resemble the case study described in Chapter 5. I also hope that my in-depth account of the

design project where I simultaneously developed and experimented with DTE provides designers with useful and actionable inspiration for putting the method in practice.

## Chapter 8

# REFLECTION

In the beginning of this dissertation, I posed the question: “How can we design for play that permeates everyday life and supports us socially and emotionally?” That is a broad, complex question that cannot be fully answered within the scope of a doctoral project. Rather, it calls for long-term, collective efforts from diverse members of the interaction design community—efforts that originated far before I started my career as a designer and that will continue to be necessary moving forward. The work I presented here is my contribution, as of today, to that growing body of work: I provide conceptual, methodological, and domain specific insights that might support the design of technologies and experiences that enrich people’s daily activity in ways that are socio-emotionally rich. I see my work as a step towards making tech design a more playful, humane, sensible, democratic practice: it provides new angles for designing for ordinary, everyday play from the bottom-up by involving a diverse range of perspectives about and understandings of the potential of tech to enrich people’s lives. I hope to inspire other play designers with my proposed concepts, methods, and design-oriented insights, and I am excited to further my explorations as I move forward with my design research career.

My doctoral project was motivated, mainly, by my own, first-person struggle with designing for play that is contextually meaningful and enriches the socio-emotional texture of mundane, everyday situations and activities. As such, it has always been very important to me that this work helps designers (including myself) to design for meaningful play. In this chapter, I discuss how my contribution can support future, increasingly playful and bottom-up tech design practices: I argue for its relevance, strengths, and limitations; I position it in relation to related works; I reflect on the process behind it; and I outline exciting directions for future research.

I structure my reflections based on my three contributions: conceptual, methodological, and domain specific. Overall, here is how I hope those three contributions will influence diverse actors within technology innovation: First, my conceptual contribution can provoke and inspire both designers, funders, policy makers, and other stakeholders who set agendas in tech development to pay more attention to the potential of play to respond to people's socio-emotional needs; it can help to define design and research directions that push for increasingly playful and socio-emotionally sensitive approaches to the human-technology interplay. Second, my methodological contribution can empower designers to fulfill those agendas; it provides actionable strategies and tools for designing for everyday play that is contextually meaningful and responds to people's socio-emotional needs. Finally, my domain-specific contribution can inspire designers to approach the specific domains of Human-Food Interaction and Smart City Innovation through such playful and socio-emotionally sensitive lens; it provides inspiration and early ideas that can help those designers to identify promising opportunities for intervention in those spaces. The following pages illustrate in more depth my thinking about the work I have done over the last years, as well as my plans for advancing it in the future.

## **8.1. Conceptual contribution**

Although I am a designer whose focus has always been mostly practice-oriented, I have always seen value in using theory to support my work. Rather than using it to drive ideation and concept development (as is common in many approaches to play design, see Chapter 2), I find theory to be most useful when it comes to weaving my higher-level design agenda—for example, when articulating the motivations behind the work I do and the things I create. and translating those motivations into fruitful design action. Theory also helps me as a tool for contrasting, refining, and enriching in-progress ideas I produce through multi-stakeholder co-design. In other words, I see theory as a steppingstone that helps to structure my thinking,

articulate my design agenda, and ground my co-design explorations into the potential of play to enrich our daily lives, in ways that these engagements are sharp and focused.

As noted in 1.1, one of the struggles I experienced as a play designer before embarking on my Ph.D. was realizing that, especially in the industry sector, play is often regarded as a motivational tool for stimulating productivity. While I found that approach valuable, I would have liked to see (and work on) more projects centered on other, less utilitarian agendas. Unfortunately, those were often deemed less valuable, and therefore less interesting to pursue. That struck me, as I always thought that one of the most valuable qualities of play was its capacity to make people thrive, regardless of a productive outcome. Due to that experience, I realized it was important for me to be able to theoretically ground my agenda of designing technology that enabled people to experience mundane situations where they could spontaneously be playful “just because”, as part of their day-to-day, for its inherent social, emotional, and cultural effects—what Sharp and Thomas call “the eudaimonic function of play” [217]. While I found a plethora of literature that discussed the relevance of play beyond productivity, it was hard to find a synthesis that I could use to engage in fruitful discussions with the people with whom I was doing my work. I thought I needed to be able to make a compelling case that foregrounded the value of my agenda. That is why I began to ask myself: “Why should Playful HCI transcend productivity-focused agendas? How can playful technology contribute to people’s social and emotional wellbeing?”

The “Technology for Situated and Emergent Play” bridging concept I produced (see Chapter 3) is my attempt at making a synthetic and accessible (yet rigorous) design-oriented case for the value of designing for play that is not materially productive. I see that as a valuable and necessary contribution, for two reasons: First, it makes clear, and grounds in a plethora of reliable design and research work, the value of designing for unproductive play, highlighting experiential qualities of play that scholars from different disciplines have shown to be

societally desirable; Second, it provides early inspiration for designers interested in making those kinds of play experiences accessible to people, by design. The CHI '20 paper [10] where I present this contribution is a piece I would have liked to read, learn from, and use myself; since I could not find it, I decided to work towards writing it myself.

The value of my conceptual contribution lies in its capacity to orient designers towards many of the virtues of play and playfulness that can be considered socio-emotionally fruitful. It can help designers (and the stakeholders they need to deal with) to: (1) be cognizant about the capacity of play to respond to socio-emotional experiences people long for, (2) provide a solid rationale for incorporating these experiences as guiding values in their work, and (3) better target that socio-emotional potential so it can be more effectively realized by design. However useful, my conceptual contribution should not be seen as a direct guideline for designing for play—not if we look at play design as a highly contextual and idiosyncratic activity, as I do. Like any theoretical contribution (and, even more so, like any synthesis of multi-disciplinary theory), this work can only get so far when it comes to guiding design. Rather than a rigid ruleset, I propose it should be used as an inspirational starting point for shaping socio-emotionally focused design agendas within play design, as well as an early source of ideas for beginning to think about how to realize those agendas. By no means does my conceptual work offer step-by-step guidelines for how to ideate socio-emotionally rich playful experiences—if any such guidelines are in fact possible. I see my bridging concept as a tool for reflection about the potential of play design to make people's day to day more fun and exciting, and I suggest using it in combination with bottom-up, contextually sensitive play design methods such as the ones I presented in Chapters 4 and 7.

As a designer who is mostly interested in the practice of design and its methodological underpinnings, I do not have concrete plans for further advancing my conceptual contribution. Yet, I acknowledge there is ample room for future work in this direction, e.g.: to explore the

possible socio-emotionally negative implications of playful tech; to investigate the relationship of play and power, and its capacity to reconfigure established dynamics between different members of a community; or to experiment with more nuance how the desirable qualities foregrounded in my bridging concept may or may not apply in specific areas of human life. While I do not reject the idea of addressing these and other theoretical issues in the future, I intend to do so through the lens of practice. Rather than reflecting through the lens of theory, in future work I will use my bridging concept as a source of inspiration: I will apply the values, ideas, and recommendations foregrounded in my intermediate knowledge piece to better ground my design work in applied design projects. By doing so, I hope I will advance my thinking about those concepts, and further understand in which ways they may or may not support the practice of design. I will eventually report on my reflections should I think they can add value in the context of design research and/or HCI.

## **8.2. Methodological contribution**

I see my methodological contribution as the cornerstone of my doctoral project. That may be due to my prior struggles as a play designer, motivated by the lack of actionable methods I experienced when designing for contextually meaningful everyday play. With the methods research presented in this dissertation I have tried to propose new ways of designing for play from the bottom-up. At the core of my methodological experiments have always been the questions of: “How can we design technology that intertwines well with mundane activity? What tools and strategies do we need to design for situated and emergent play?”

My main response to those questions is the Situated Play Design (SPD) proposal, which is meant to help designers to facilitate design processes where playful interventions emerge from rich, slow, contextual engagement between designers and stakeholders. SPD enables designers to build rich connections with other people’s contexts, routines, and sensitivities as

a means of developing interventions that adapt well to and enrich—rather than disrupt—the natural flow of those ecosystems. It extends existing play design approaches by centering the designer’s attention on the playful things people already find fun in their local contexts and practices, as a means of supporting the design of playful interventions that help to realize (or enhance) that playful potential.

With my SPD paper [6], I aimed to empower designers to co-imagine increasingly playful futures from the bottom-up, building on contextual playful practices that are inherent in a targeted design scenario as focal elements of an intervention. In my experience, such an approach makes it actionable to design for play that is likely meaningful in context—to build on playful things people already do and enjoy, often spontaneously, in a particular setting, and that can therefore be used as core components of a playful intervention. I find those contextual play forms, the so-called “play potentials”, to be a very valuable design construct: they encapsulate playful ways of being that bring joy to real people. In my design cases, as described in Chapters 5 and 6, they helped me and my fellow designers to empathize with our stakeholders’ understandings of the kinds of playful experiences that might add value to their day-to-day, in ways that we could pursue design directions that were sensible to the kinds of socio-emotional experiences they were longing for.

From my (still relatively short) experience of using play potentials to drive my design work, I can already argue for their capacity to enable designers to identify and make design use of play-focused contextual information. That can be a very valuable asset in design processes where the aim is not to disrupt an ordinary practice with a surprising intervention but rather to enrich it by cultivating its inherent qualities and capacity to stimulate play. The “play potentials” construct helps designers to deal with, and realize, the inherent capacity of mundane situations to become playful—as such, it offers a constructive, complementary, and (I argue) necessary alternative to the more common approach of designing technology that

affords novel, disruptive, surprising forms of play. Using play potentials allows designers to focus their attention on the kinds of things people find fun already, and then build on that existing playful material to enable play experiences that are contextually sound. As such, it focuses designers on the socio-emotional qualities of play experiences rather on their aims or expected outcomes—which is a pitfall of many non-entertainment play design works, where the outcomes of the activity are privileged over the experiential texture of the activity, to the detriment of its socio-emotional capacity. My methodological work provides a focused lens through which designers can center their attention on the fun things people already do and enjoy in a particular context, and use them as design material. As a result, they can co-design playful interventions that stem out of the idiosyncrasies of users and their context rather than being motivated by the designer’s practical expertise, creative capacity, or theoretical knowledge.

Further, my approach makes actionable the act of prototyping and engaging stakeholders not to test the assumptions and intuitions of designers, but project their preferences, desires, and values onto the designers’ work and shape emergent design spaces with them. In a way, one could say it enables “design before design”: in-depth, rich, contextual design engagements with stakeholders that do not require technical expertise yet allow them to contribute early, imaginative design ideas. Through Situated Play Design, designers can empower average people to contribute to technology innovation beyond influencing the minor details of a specific design. That approach thus extends existing play design techniques by enabling co-design participants to shape not only the concrete qualities of a specific artifact but also the foundations of the emerging design space that technology will inhabit. They extend the role of stakeholders and their opportunities for participation, from simply co-designing a technology to co-defining an emerging technology space.

Importantly, my work so far around the construct of play potentials has mostly been practice-oriented. I developed the original construct “just enough” so I could use it in my own work, and then explored through hands-on practice how it may and may not help me to get the job done. I also developed three concrete methods to help designers deal with this construct: “Play & culture workshops” can help them to surface play potentials in areas where cultural rituals have a strong resonance, e.g. in food practices; “Chasing play through social media” enables them to investigate the kinds of playful things people enjoy in settings they cannot have in-person access too, which can be a real asset in challenging design projects (e.g. due to a pandemic) but also in design projects targeting a diversity of geographically distributed contexts; and finally, “Designerly Tele-Experiences” can help them to facilitate experience-focused co-design sessions in-context while not disrupting that context with their presence, which can be very useful in design projects targeting private spaces like the household. These are ways in which I think my three proposed SPD methods can be used based on my limited experience so far; in future work I intend to experiment with them in other design projects so I can offer a more nuanced idea on how they can support other designers’ work.

In future work, I also intend to build on those and other lived experiences to reflexively examine the construct of play potentials in more depth, to provide a more solid theoretical articulation that better clarifies its scope and usefulness. I also intend to continue developing concrete tools for chasing and making designerly use of play potentials. As part of my case studies, I had to develop different mechanisms for implementing the Situated Play Design approach. I see them as an early toolkit of SPD methods (see Chapter 7): a first take on a set of actionable strategies for dealing with play potentials in ways that simulate interesting, fruitful play design processes. The techniques I developed so far are intimately related to the specific needs of my two case studies, e.g. the “Designerly Tele-Experiences” method responds to the unforeseen challenges derived from the COVID-19 pandemic. In future work,

I am excited to continue to develop new SPD methods and tools to make my methodological proposal more actionable, building on the directions proposed in my Halfway to the Future '19 paper [9] and beyond. I hope other design researchers will join me in that process; I see SPD as an open, inclusive methodology that will only be more useful if appropriated by a broad range of people who actively practice in the space of playful design.

Without a doubt, SPD is a largely underexplored methodological space, still in formation. Thus, rather than presenting my contribution as a finalized proposal, I see it as the seed for a long-term research program. I am genuinely excited about its potential, and I am determined to further develop it as I transition to new stages of my academic career. That will bring about challenges beyond just incorporating new methods to the SPD toolkit; I will also have to deal with and address the limitations of existing methods. One of those limitations is that the strategies and tools I presented in this dissertation were developed through active, hands-on engagement with design practice, in rather experimental and under-controlled (some may even say “chaotic”) circumstances. While that approach can rightfully be considered rigorous (e.g. it is largely influenced by Schön’s action-reflection approach to design research [212], which is known to be a powerful mechanism for producing new knowledge about the design process), I see a need for consolidating my early proposals through a set of more focused explorations that help me to more precisely evaluate the impact of my proposed methods in practice and in diverse design scenarios. For example, I intend to study the impact of “Designerly Tele-Experiences” and “Play & culture workshops” in other design projects, ideally through the lens of other designers’ ways of working and concerns. I also see an opportunity for better unpacking some of the underlying mechanisms behind the methods I have begun to introduce in this dissertation, e.g. to further investigate how insights from social media-based strategies (which can arguably be considered global rather than local) can be leveraged in local contexts to design for contextually meaningful play. While in my

playful urban tech case study I began to hint at how those rather global insights could be made useful in the context of idiosyncratic, local practices (e.g. through multi-stakeholder conversations using catalogs of speculative ideas), I see a need for further exploring those and other relevant angles of my proposed strategies in future methods research. Overall, I see my methodological work as an exciting, novel, and useful contribution that begins to enable play design practices that are more bottom-up, playful, and imaginative. I look forward to strengthening my knowledge in this area, both from a theoretical and best-practice perspective, and I am committed to take this research direction as a central one in the upcoming stages of my career.

### **8.3. Domain-specific contribution**

Experimenting with my proposed concepts and methods in concrete design projects helped me to further advance my conceptual and, especially, my methodological contribution. That was, from the onset, the principal goal of my doctoral project. However, my hands-on work co-designing technology using the Situated Play Design methodology also yielded collateral outcomes: I began to shed light on the playful potential of two concrete design spaces within HCI (mealtime and urban experiences) and speculate about how technology might help to realize that potential. As a result of that process, I produced a body of domain specific knowledge designers and researchers in those two spaces might find useful, as it points them towards kinds of playful experiences people seem to long for in these specific domains.

Overall, the contribution I am making to the fields of Human-Food Interaction (Chapter 5) and Smart City Innovation (Chapter 6) is similar in its scope and structure. I present: (1) inspirational starting points for designing tech that supports and enriches the kinds of playful experiences people already find meaningful in these two scenarios, i.e. play potentials; (2) speculative ideas that illustrate a range of ways in which those play potentials could be

responded to by technology design; and (3) multi-stakeholder responses to those ideas, articulated as reflexive considerations designers might want to make when designing technology in these emerging design spaces.

Experimenting with the SPD approach in these two domains allowed me to shed light on two design spaces that are rather new, where existing work has either focused on exceptional, out-of-the-ordinary experiences (e.g. in fine dining) or has hardly embraced a participatory angle (e.g. in many playable city interventions). By engaging with the idea of chasing play potentials and using them as the cornerstone of the design process, I could engage diverse people to have a say in beginning to carve the foundations of these novel design spaces. As a result, I surfaced interesting design qualities, directions, and ideas that can be further explored in future work. While the domain-specific knowledge produced through the SPD approach is not necessarily generalizable—that is, it offers starting points for designers to begin to explore alternative paths to technology design but that those should not be seen as fully fleshed design directions—that approach enabled a bottom-up process where average citizens (as opposed to technology or expert innovators only) could contribute to co-imagining the future of mundane playful technology. It gave rise and presence to diverse takes on the questions of: What should these emerging design spaces look like, and what might their contours be? What values and agendas should they respond to? And ultimately, why should we be designing playful technology targeting those situations, and how?

I see this approach as an interesting way of beginning to explore emergent design spaces where technology might not yet be a relatable part of people's day-to-day; spaces where people may have little lived experiences with technology, to a point that they have a hard time contributing new design ideas. By engaging diverse participants in playful, speculative, and embodied co-design activities, I was able to help them to connect with a rather unfamiliar design space at an experiential level, which in turn enabled them to relate to my design goals

and contribute insightful ideas that advanced my thinking in valuable ways. Importantly, that enabled me to question the very idea that play is needed in each and every area of our lives—it probably is not—and that technology is always the right tool to support it—it is not either, I argue—and center my imaginative engagements on the more nuanced question: Where can play and, potentially, technology help us to enrich the experiential texture of people’s day-to-day, and how? The critical discussions around the notion of a “dictatorship of playfulness”, which were present and intense in the playable city case study (see Section 6.5), are a clear example of that. They led to interesting considerations about where urban play may and may not add value, and what might be necessary (and undesirable) design choices to support it. The kinds of imaginative, experience-driven co-design engagements I led in the two case studies within my doctoral project allowed me to surface multi-stakeholder views on the potential and limitations of playful technology to make a positive impact in concrete areas of human life; that, in turn, opened up new and exciting avenues meaningful technology design.

In the space of Human-Food Interaction, my work revolved around the question of: “How can we reclaim the social, emotional, and cultural relevance of mealtime?” By learning about (and empathizing with) people’s self-motivated playful and social practices at mealtime, I was able to experiment with new ways of thinking about how technology might enrich them. As a result, I provided a set of exciting new, increasingly playful and socio-emotionally sensitive directions for HFI design that are contextually grounded and respond to the playful eating practices and desires of real people. In future work, I would like to further my understanding about the kinds of playful experiences that can contribute to enriching our food lives, focusing on two directions: (1) expanding the scope of my explorations to other kinds of food practices beyond eating (e.g. cooking, buying, growing, or foraging foods), and (2) exploring how fun and joy can be platforms for supporting more sustainable ways of doing those practices.

Though the findings from my co-design engagements point towards exciting new design directions in Playful HFI, the outcomes of the evaluation of my final “PlaceMap” prototype show that there is still much to be learned when it comes to understanding what design qualities might support rich playful experiences around food, and how these can be used by designers to target the idiosyncrasies of concrete design scenarios. Developing and testing the “PlaceMap” prototype (which instantiates key learnings from my bottom-up co-design process) helped me to bring my findings back to the contextual domain of people’s day-to-day activity, and that surfaced interesting reflections that add nuance to my earlier findings. Most importantly, that process highlighted something technology designers always should keep in mind according to my own experience: everyday practices such as eating are highly contextual and, as such, playful technology targeting them should be designed from the bottom-up, with careful attention to how certain design choices and qualities may or may not align well the idiosyncrasies of people and their local contexts. Generalized design guidelines will only get us so far when designing these kinds of interventions; it is important to circle back to the local contexts and audiences we are designing for and explore in which way those recommendations can be applied to the idiosyncrasies of the scenario at hand.

In the second case study, I shifted attention from mealtime to urban experiences. I asked myself: “How can we rethink the way we go about smart city innovation in increasingly playful and socio-emotionally sensitive directions?” My contribution in this space is fairly similar to the one I made in the other case study: I surfaced a set of play potentials relevant to urban experiences, I speculated different ways in which technology might respond to that playful potential, and I engaged diverse stakeholders to better understand what kinds of playful futures different people may want for their cities (if any). Importantly, in this case study I could not get as far as in the previous one: I did not manage to produce and evaluate a final, fully functioning prototype of a technology inspired by the learnings from my co-design process.

That was mainly due to the unexpected challenges derived from the COVID-19 pandemic: engaging people in co-located social play in public spaces was not an option, so I could not deploy and evaluate a high-fidelity prototype in context. Instead, I opted for using my speculative ideas as provocative prompts to engage diverse stakeholders in reflexive conversations about the kinds of playful urban experiences they would like to engage in as a part of their daily urban activity. Overall, my work in this space provides powerful, bottom-up support for urban technology designers and researchers—even those who contributed to this design space before—whose agenda is to use playful technology to enrich cities socially, culturally, and emotionally. In future work, when external circumstances make it possible, I would like to further concretize my contribution: I will collaborate with policy makers and urban planners to design localized interventions that allow me to investigate in more depth the effects of some of the play forms highlighted by my findings, in specific urban locations.

To conclude, I would like to note that, however exciting, mealtime and urban experiences are nothing but two among the many areas of people's day-to-day where technology could make a positive, playful impact. I believe that the concepts, values, and methods I experimented with throughout my doctoral project could be useful in many other areas of technology design and research. Therefore, in future research I intend to work towards realizing the playful potential of other everyday life domains using (and extending) my Situated Play Design methodology. In particular, there are two areas that I intend to target in a near future: First, I am intrigued by how playful technology might help to support civic engagement, enticing and empowering people to have a more active and conscious participation in diverse areas of public life (e.g. in civic protest, social organization, or community building). Given play's capacity to add a positive note to mundane experiences, to bring people together towards shared activity, and to empower critical thinking and subsequent action (see Chapter 3), I see an opportunity in leveraging it to support people to play a more active part in society. Second,

I am excited about the potential of playful technology in the context of nature. I want to explore how the dynamic, interactive properties of technology can be leveraged to afford the kinds of slow, careful, subtle, sensorial experiences that align well with natural practices—qualities that are not always at the forefront of technology design, where fast, bright, overly-stimulating types of experiences abound. Overall, in future work I intend to broaden the scope of application of my situated, bottom-up, and imaginative approach to playful technology design, to further understand how it can help us to co-create future human-technology interplays that are more socio-emotionally sensitive and fun.

## Chapter 9

# CONCLUSION

In this dissertation I presented the outcomes of my doctoral research as well as the process behind them. The aim of my project was to shed light on the design for everyday play to, first, empower designers to co-create new technologies that afford contextually meaningful forms of play and, in doing so, enrich the socio-emotional texture of people's daily activity. I also wanted to influence other stakeholders who set agendas in technology design, such as funders, managers, or policy makers. Overall, my aim was to contribute to steering the digital technology sector in increasingly playful and socio-emotionally sensitive directions, hoping that that will lead to the development of technologies and experiences that integrate well within mundane, contextual activities and scenarios and enrich their experiential texture.

The project was motivated by my own struggles with designing for everyday play, as well as the lack of existing concepts, strategies, and tools I found when trying to overcome those struggles. Using a combination of design-led approaches (e.g. participatory design, speculative methods, action-reflection...) and methods from HCI (e.g. in-the-wild user studies) and the humanities (e.g. close reading), I looked at playful tech design from three different angles—all of them important to understanding how to design for contextually meaningful and socio-emotionally fruitful daily play. That gave rise to a three-fold contribution:

First, the conceptual contribution of my research responds to the need for supporting playful design that is not bound to materially productive agendas—an approach that is clearly in the minority in HCI and technology design. To illustrate the value of play as an inherent, fundamental aspect of human life, I produced a “bridging concept” intermediate knowledge piece that (1) highlights three experiential qualities of play that can be considered desirable from a socio-emotional perspective, (2) illustrates how playful technology can deliver those

kinds of experiences, and (3) provides actionable inspiration for designers interested in developing similar kinds of interventions. That contribution stems from a synthesis of existing literature and practice from different areas of play design and scholarship, including perspectives as diverse as sociology, psychology, philosophy, computer science, HCI, design, the arts, and cultural studies. Overall, my conceptual contribution provides designers with solid rationale, as well as inspirational starting points, for designing playful technologies that, rather than making our playtime productive, appeal to our need for joy, agency, and social connection—all of which I argue are societal goods designers should cultivate.

The second component of my doctoral research, perhaps the central one, is a methodological contribution. Motivated by my own struggle with designing for play that is contextually meaningful and speaks to the playful desires of specific people in specific settings, I set out to investigate strategies to make that design agenda more actionable. I began by reflexively examining my own previous practice, to unpack the process behind design cases where I felt I managed to deliver playful experiences my stakeholders found exciting and contextually fun. Through conversations with other designers about their similar experiences, I formulated the Situated Play Design (SPD) approach as a broad methodological umbrella that encompasses play design practices geared towards designing for play that is contextually sound. SPD proposes to closely engage stakeholders and their context to learn about and empathize with their existing playful practices in a targeted design scenario. Those existing manifestations of contextual playful engagement, i.e. what I call “play potentials”, can then be used as building bricks of a playful intervention. Through that process, designers can create playful tech and experiences that build on practices that are already meaningful for people and, hence, that will adapt well to the idiosyncrasies of the design context at hand. Throughout my doctoral project, I experimented with the SPD approach in two case studies, to further advance my understanding of how it may be used in practice and to develop actionable mechanisms for

implementing it. As a result, I was able to present an emergent toolkit of SPD methods, currently comprised of 3 techniques: First, “Play & culture workshops” allow designers to find playful inspiration in rituals and traditions, thus leverage forms of play that have long been ingrained in the cultural practices of a community; Second, “Chasing play through social media” allows designers to document their in-the-wild lived experiences and observations in a lightweight way, as well as to explore other people’s online accounts of their spontaneous playful activity, as a means of creating collections of multi-stakeholder play potentials; Third, “Designerly Tele-Experiences” allow designers to engage remote stakeholders in speculative, experience-focused co-design conversations about the desirable playful qualities of tech in emergent design spaces. In future work, I intend to continue developing new SPD methods to make my proposed approach more actionable and useful; I hope the open-ended and inclusive nature of the SPD methodological umbrella will also make it appealing for other designers to contribute to enriching it with useful tools and strategies from their own work.

Finally, the third layer of my doctoral research was domain specific. To experiment with the above concepts and methodology, I led two design projects where I investigated how technology might playfully enrich the socio-emotional texture of two concrete areas of human life: mealtime and urban experiences. Aside from the methodological learnings from those processes, described above, this work also yielded domain specific insights. I was able to identify promising directions for the design of playful mealtime and urban technology and gather multi-stakeholder perspectives on how those future playful tech scenarios may and may not add value to people’s day-to-day. In both case studies, I contributed: (1) play potentials that point designers towards kinds of playful experiences people already engage in and enjoy within the targeted contexts and activities; (2) speculative ideas that illustrate diverse ways in which technology could respond to that playful potential; and (3) multi-stakeholder perspectives on those play potentials and speculative ideas, which foreground

important considerations designers might want to make when developing playful interventions targeting those spaces. Overall, my domain specific contribution can be powerful support for designers interested in developing bottom-up, contextually meaningful playful interventions in Human-Food Interaction and Playable Smart City design.

The three contributions of my doctoral research are part of an ongoing, long-term research agenda. My work is by no means the first to explore the design space of mundane, everyday play design, nor does it present the ultimate guidelines for supporting these kinds of design practices—if there can even be such a thing. I see it as an exciting step further in that direction, one that provides bottom-up, imaginative tools for supporting contextually and socio-emotionally sensitive play design. In the future, I intend to continue working on making this design and research agenda more actionable, looking at it from the perspective of both methodology and practical implementation. I am committed to continue exploring how my design methods and agenda can add value in diverse areas of human life. Overall, I see this doctoral project as the seed that will grow and flourish into an exciting design research career focused on investigating and leveraging the many possibilities of playful technology design.

# Appendix A

## SUMMARY OF PUBLICATIONS

Title	Venue	Contribution			First author	DOI
		C	M	DS		
Co-Imagining the Future of Playable Cities: A Bottom-Up, Multi-Stakeholder Speculative Inquiry into the Playful Potential of Urban Technology	CHI '22 <i>full paper</i>					*conditionally accepted by the time this dissertation was archived
Designery Tele-Experiences: a New Approach to Remote Yet Still Situated Co-Design	ToCHI <i>article</i>					*under review by the time this dissertation was archived
The Playful Potential of Shared Mealtime: A Speculative Catalog of Playful Technologies for Day-to-day Social Eating Experiences	CHI Play '21 <i>full paper</i>					<a href="https://doi.org/10.1145/3474694">https://doi.org/10.1145/3474694</a>
Through the Zoom Glass: Drawing Design Inspiration from Mediated Playful Interactions with Food and Child Personas	CHI Play '21 <i>rapid comm.</i>					<a href="https://doi.org/10.1145/3450337.3483452">https://doi.org/10.1145/3450337.3483452</a>
A Catalog of Speculative Playful Urban Technology Ideas: Exploring the Playful Potential of Smart Cities	Mindtrek '21 <i>full paper</i>					<a href="https://doi.org/10.1145/3464327.3464374">https://doi.org/10.1145/3464327.3464374</a>
Chasing Play on TikTok from Populations with Disabilities to Inspire Playful and Inclusive Technology Design	CHI '21 <i>full paper</i>					<a href="https://doi.org/10.1145/3411764">https://doi.org/10.1145/3411764</a>
Drawing From Social Media to Inspire Increasingly Playful and Social Drone Futures	DIS '21 <i>pictorial</i>					<a href="https://doi.org/10.1145/3461778.3462020">https://doi.org/10.1145/3461778.3462020</a>
Technology for Situated and Emergent Play: A Bridging Concept and Design Agenda	CHI '20 <i>full paper</i>					<a href="https://doi.org/10.1145/3313831.3376859">https://doi.org/10.1145/3313831.3376859</a>
Chasing Play with Instagram: How Can We Capture Mundane Play Potentials to Inspire Interaction Design?	CHI '20 <i>late-breaking work</i>					<a href="https://doi.org/10.1145/3334480.3382913">https://doi.org/10.1145/3334480.3382913</a>
Chasing Play Potentials in Food Culture: Learning from Traditions to Inspire Future Human-Food Interaction Design	DIS '20 <i>pictorial</i>					<a href="https://doi.org/10.1145/3357236.3395575">https://doi.org/10.1145/3357236.3395575</a>
Disrupting (More-than-) Human-Food Interaction: Experimental Design, Tangibles and Food-Tech Futures	DIS '20 <i>full paper</i>					<a href="https://doi.org/10.1145/3357236.3395437">https://doi.org/10.1145/3357236.3395437</a>
Feeding the Futures of Human-Food Interaction	<i>interactions article</i>					<a href="https://doi.org/10.1145/3414471">https://doi.org/10.1145/3414471</a>
Chasing Play Potentials: Towards an Increasingly Situated and Emergent Approach to Everyday Play Design	DIS '19 <i>full paper</i>					<a href="https://doi.org/10.1145/3322276.3322325">https://doi.org/10.1145/3322276.3322325</a>
Making Sense of Human-Food Interaction	CHI '19 <i>full paper</i>					<a href="https://doi.org/10.1145/3290605.3300908">https://doi.org/10.1145/3290605.3300908</a>
Playful Human-Food Interaction Research: State of the Art and Future Directions	CHI Play '19 <i>full paper</i>					<a href="https://doi.org/10.1145/3311350.3347155">https://doi.org/10.1145/3311350.3347155</a>
Designing for Play that Permeates Everyday Life: Towards New Methods for Situated Play Design	HttF '19 <i>short paper</i>					<a href="https://doi.org/10.1145/3363384.3363400">https://doi.org/10.1145/3363384.3363400</a>
Visualising the landscape of Human-Food Interaction research	DIS '18 <i>work-in-progress</i>					<a href="https://doi.org/10.1145/3197391.3205443">https://doi.org/10.1145/3197391.3205443</a>

Table 1. Shortlist of the papers I published during my PhD. For each paper, I note: (1) the title, (2) the venue where it was published and the type of publication, (3) the contribution(s) it speaks to, i.e., conceptual, methodological, or domain specific, (4) whether I served as first or secondary author, and (5) the DOI, so it can be easily accessed. The papers featured on the list relate directly to the contribution presented in this thesis; additional papers I published during my PhD studies can be found on my personal website: <http://www.ferranaltarriba.com>

## REFERENCES

- [1] Chadia Abras, Diane Maloney-Krichmar & Jenny Preece. 2004. User-centered design. *Bainbridge, W. Encyclopedia of Human-Computer Interaction. Thousand Oaks: Sage Publications*, 37(4), 445-456.
- [2] Ferran Altarriba Bertran and James Miller. 2014. *What if you were in...* Retrieved on November 30, 2018 from <http://ferranaltarriba.com/projects/wiywi>
- [3] Ferran Altarriba Bertran. 2017. *Playing with food: enriching and diversifying the gastronomic experience*. MSc thesis. University of Southern Denmark.
- [4] Ferran Altarriba Bertran and Danielle Wilde. 2018. Playing with food: reconfiguring the gastronomic experience through play. In *Proceedings of the 1st International Conference on Food Design and Food Studies (EFOOD 2017)*, October 19-21, 2017, Lisbon, Portugal.
- [5] Ferran Altarriba Bertran\*, Samvid Jhaveri, Rosa Lutz, Katherine Isbister and Danielle Wilde\*. 2019. Making Sense of Human-Food Interaction. In *CHI Conference on Human Factors in Computing Systems Proceedings* May 4–9, 2019, Glasgow, Scotland UK. ACM, New York, NY, USA, 13 pages. <https://doi.org/10.1145/3290605.3300908> (\* joint first-authors)
- [6] Ferran Altarriba Bertran, Elena Márquez Segura, Jared Duval and Katherine Isbister. 2019. Chasing Play Potentials: Towards an Increasingly Situated and Emergent Approach to Everyday Play Design. In *Proceedings of the 2019 on Designing Interactive Systems Conference (DIS '19)*. ACM, New York, NY, USA, 1001-1015. DOI: <https://doi.org/10.1145/3322276.3322325>
- [7] Ferran Altarriba Bertran\*, Danielle Wilde\*, Ernő Berezvay and Katherine Isbister. 2019. Playful Human-Food Interaction Research: State of the Art and Future Directions. In *Proceedings of the 2019 Annual Symposium on Computer-Human Interaction in Play (CHI Play '19)*. ACM, New York, NY, USA, 1001-1015. DOI: <https://doi.org/10.1145/3322276.3322325> (\* joint first-authors)
- [8] Ferran Altarriba Bertran, Danielle Wilde, Elena Márquez Segura, Oscar Garcia Pañella, Laia Badal León, Jared Duval and Katherine Isbister. 2019. Chasing Play Potentials in Food Culture to Inspire Technology Design. In *Proceedings of the 2019 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (CHI PLAY '19 Extended Abstracts)*. DOI: <https://doi.org/10.1145/3322276.3322325>

- [9] Ferran Altarriba Bertran, Elena Márquez Segura, Jared Duval and Katherine Isbister. 2019. Designing for Play that Permeates Everyday Life: Towards New Methods for Situated Play Design. In *In Proceedings of the Halfway to the Future Symposium 2019 (HTTF 2019)*, November 19–20, 2019, Nottingham, United Kingdom. ACM, New York, NY, USA, 4 pages. <https://doi.org/10.1145/3363384.3363400>
- [10] Ferran Altarriba Bertran, Elena Márquez Segura and Katherine Isbister. 2020. Technology for Situated and Emergent Play: A Bridging Concept and Design Agenda. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–14. DOI:<https://doi.org/10.1145/3313831.3376859>
- [11] Ferran Altarriba Bertran, Laia Turmo Vidal, Ella Dagan, Jared Duval, Elena Márquez Segura, and Katherine Isbister. 2020. Chasing Play with Instagram: How Can We Capture Mundane Play Potentials to Inspire Interaction Design? In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (CHI EA '20)*. Association for Computing Machinery, New York, NY, USA, 1–8. DOI:<https://doi.org/10.1145/3334480.3382913>
- [12] Ferran Altarriba Bertran, Jared Duval, Elena Márquez Segura, Laia Turmo Vidal, Yoram Chisik, Marina Juanet Casulleras, Oscar Garcia Pañella, Katherine Isbister and Danielle Wilde. 2020. Chasing Play Potentials in Food Culture: Learning from Traditions to Inspire Future Human-Food Interaction Design. In *Proceedings of the 2020 ACM on Designing Interactive Systems Conference (DIS '20)*. Association for Computing Machinery, New York, NY, USA, 979–991. DOI:<https://doi.org/10.1145/3357236.3395575>
- [13] Ferran Altarriba Bertran, Rosa Lutz and Katherine Isbister. 2020. Where Interaction Design Meets Gastronomy: Crafting Increasingly Playful and Interactive Eating Experiences. In *Proceedings of the 2nd International Conference on Food Design and Food Studies, Experiencing Food, Designing Sustainable and Social Practices (EFOOD'19)*. November 28–30, 2019, Lisbon, Portugal.
- [14] Ferran Altarriba Bertran, Jared Duval, Laura Bisbe Armengol, Ivy Chen, Victor Dong, Binaisha Dastoor, Adrià Altarriba Bertran, and Katherine Isbister. 2021. A Catalog of Speculative Playful Urban Technology Ideas: Exploring the Playful Potential of Smart Cities. In *Academic Mindtrek 2021 (Mindtrek '21)*, June 01–03, 2021, Tampere/Virtual, Finland. ACM, New York, NY, USA, 12 pages. <https://doi.org/10.1145/3464327.3464374>
- [15] Ferran Altarriba Bertran, Soomin Kim, Minsuk Chang, Ella Dagan, Jared Duval, Katherine Isbister, and Laia Turmo Vidal. 2021. Social Media as a Design and Research Site in HCI: Mapping Out Opportunities and Envisioning Future Uses. *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, Article 120, 1–5. DOI:<https://doi.org/10.1145/3411763.3441311>

- [16] Ferran Altarriba Bertran, Alexandra Pometko, Muskan Gupta, Lauren Wilcox, Reeta Banerjee, and Katherine Isbister. 2021. The Playful Potential of Shared Mealtime: a speculative catalog of playful technologies for day-to-day social eating experiences. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5, CHI PLAY, Article 267 (September 2021), 26 pages, <https://doi.org/10.1145/3474694>
- [17] Stefano Andreani, Matteo Giacomo Maria Kalchschmidt, Roberto Pinto, & Allen Sayegh. 2019. Reframing technologically enhanced urban scenarios: A design research model towards human centered smart cities. *Technological Forecasting and Social Change*, 142, 15-25.
- [18] Charbel Aoun. 2013. The smart city cornerstone: Urban efficiency. *Published by Schneider electric*.
- [19] Francesco Paolo Appio, Marcos Lima, & Sotirios Paroutis. 2019. Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. *Technological Forecasting and Social Change*, 142, 1-14.
- [20] Juha Arrasvuori, Marion Boberg, Jussi Holopainen, Hannu Korhonen, Andrés Lucero, and Markus Montola. 2011. Applying the PLEX framework in designing for playfulness. In *Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces (DPPI '11)*. Association for Computing Machinery, New York, NY, USA, Article 24, 1–8. DOI:<https://doi.org/10.1145/2347504.2347531>
- [21] Jon Back, Elena Márquez Segura, & Annika Waern. 2017. Designing for transformative play. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 24(3), 1-28.
- [22] Liam Bannon, Jeffrey Bardzell, and Susanne Bødker. 2018. Reimagining participatory design. *interactions* 26, 1 (January - February 2019), 26–32. DOI:<https://doi.org/10.1145/3292015>
- [23] Richard Bartle. 1996. Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD research*, 1(1), 19.
- [24] Tilde Bekker & Alissa N. Antle. 2011. Developmentally situated design (DSD) making theoretical knowledge accessible to designers of children's technology. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2531-2540).
- [25] Tilde Bekker, Linda De Valk & Berry Eggen. 2014. A toolkit for designing playful interactions: The four lenses of play. *Journal of Ambient Intelligence and Smart Environments*, 6(3), 263-276.

- [26] Tilde Bekker, Ben Schouten and de Mark de Graaf. 2014. Designing Interactive Tangible Games for Diverse Forms of Play. In *Handbook of Digital Games* (eds M. C. Angelides and H. Agius).
- [27] Phillip Bell. 2001. Content analysis of visual images. *Handbook of visual analysis*, 13.
- [28] Marleen van Bergeijk, Bart Hengeveld, and Selma Otto. 2017. DOK: Enhancing Child Patient Empowerment. In Proceedings of the Eleventh International Conference on Tangible, Embedded, and Embodied Interaction (TEI '17). ACM, New York, NY, USA, 589–595. <https://doi.org/10.1145/3024969.3025066>
- [29] Regina Bernhaupt. (Ed.). 2010. *Evaluating user experience in games: Concepts and methods*. Springer Science & Business Media.
- [30] Olav W. Bertelsen, Susanne Bødker, Eva Eriksson, Eve Hoggan, and Jo Vermeulen. 2018. Beyond generalization: research for the very particular. *Interactions* 26, 1 (December 2018), 34-38. DOI: <https://doi.org/10.1145/3289425>
- [31] Thomas Binder & Eva Brandt. 2008. The Design:Lab as platform in participatory design research, *CoDesign*, 4:2, 115-129, DOI: [10.1080/15710880802117113](https://doi.org/10.1080/15710880802117113)
- [32] Erling Björgvinsson, Pelle Ehn, & Per-Anders. 2012. Design things and design thinking: Contemporary participatory design challenges. *Design issues*, 28(3), 101-116.
- [33] Susanne Bødker. 2006. When second wave HCI meets third wave challenges. In *Proceedings of the 4th Nordic conference on Human-computer interaction: changing roles (NordiCHI '06)*. Association for Computing Machinery, New York, NY, USA, 1–8. DOI:<https://doi.org/10.1145/1182475.1182476>
- [34] Susanne Bødker and Morten Kyng. 2018. Participatory Design that Matters—Facing the Big Issues. *ACM Trans. Comput.-Hum. Interact.* 25, 1, Article 4 (February 2018), 31 pages. DOI:<https://doi.org/10.1145/3152421>
- [35] Kirsten Boehner, Janet Vertesi, Phoebe Sengers, and Paul Dourish. 2007. How HCI interprets the probes. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '07)*. Association for Computing Machinery, New York, NY, USA, 1077–1086. DOI:<https://doi.org/10.1145/1240624.1240789>
- [36] Laurens Boer and Jared Donovan. 2012. Provotypes for participatory innovation. In *Proceedings of the Designing Interactive Systems Conference (DIS '12)*. ACM, New York, NY, USA, 388-397. DOI: <https://doi.org/10.1145/2317956.2318014>

- [37] Ian Bogost. 2014. Why gamification is bullshit. *The gameful world: Approaches, issues, applications*, 65-80.
- [38] Ian Bogost. 2016. *Play anything: The pleasure of limits, the uses of boredom, and the secret of games*. Basic Books.
- [39] Tone Bratteteig & Ina Wagner. 2012. Disentangling power and decision-making in participatory design. In *Proceedings of the 12th Participatory Design Conference: Research Papers-Volume 1* (pp. 41-50).
- [40] Virginia Braun & Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- [41] Virginia Braun & Victoria Clarke. 2020. One size fits all? What counts as quality practice in (reflexive) thematic analysis?. *Qualitative research in psychology*, 1-25.
- [42] Stuart L. Brown. 2009. *Play: How it shapes the brain, opens the imagination, and invigorates the soul*. Penguin.
- [43] Barry Brown, Julian Bleecker, Marco D'Adamo, Pedro Ferreira, Joakim Formo, Mareike Glöss, Maria Holm, Kristina Höök, Eva-Carin Banka Johnson, Emil Kaburuan, Anna Karlsson, Elsa Vaara, Jarmo Laaksolahti, Airi Lampinen, Lucian Leahu, Vincent Lewandowski, Donald McMillan, Anders Mellbratt, Johanna Mercurio, Cristian Norlin, Nicolas Nova, Stefania Pizza, Asreen Rostami, Mårten Sundquist, Konrad Tollmar, Vasiliki Tsaknaki, Jinyi Wang, Charles Windlin, and Mikael Ydholm. 2016. The IKEA Catalogue: Design Fiction in Academic and Industrial Collaborations. In *Proceedings of the 19th International Conference on Supporting Group Work (GROUP '16)*. Association for Computing Machinery, New York, NY, USA, 335–344.  
DOI:<https://doi.org/10.1145/2957276.2957298>
- [44] Barry Brown and Oskar Juhlin. 2015. *Enjoying machines*. MIT Press.
- [45] Richard Buchanan. 2012. Strategies of design research: productive science and rhetorical inquiry. In *Design research now* (pp. 55-66). Birkhäuser.
- [46] Brian Burke. 2016. *Gamify: How gamification motivates people to do extraordinary things*. Routledge.
- [47] Oliver Burkeman. 2018. The Promise of Play. *NewPhilosopher*, Issue 20, May-July 2018.
- [48] Colin Burns, Eric Dishman, William Verplank, and Bud Lassiter. 1994. Actors, hairdos & videotape—informance design. In *Conference Companion on Human Factors in*

- Computing Systems (CHI '94). Association for Computing Machinery, New York, NY, USA, 119–120. DOI: <https://doi.org/10.1145/259963.260102>
- [49] Jacob Buur and Susanne Bødker. 2000. From usability lab to “design collaboratorium”: reframing usability practice. In *Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques (DIS '00)*. Association for Computing Machinery, New York, NY, USA, 297–307. DOI:<https://doi.org/10.1145/347642.347768>
- [50] Jacob Buur and Robb Mitchell. 2011. The business modeling lab. In *Proceedings of the Participatory Innovation Conference*. 368–373.
- [51] Bill Buxton. 2007. *Sketching user experiences: getting the design right and the right design*. Morgan Kaufmann.
- [52] Roger Caillois. 2001. *Man, play, and games*. University of Illinois Press.
- [53] Stuart Candy & Jake Dunagan. 2017. Designing an experiential scenario: The people who vanished. *Futures*, 86, 136-153.
- [54] Ignasi Capdevila & Matias Zarlenga. 2015. Smart city or smart citizens? The Barcelona case. *The Barcelona Case (March 26, 2015)*.
- [55] Center for the Living City (CLC). (N.d.) Jane Jacobs. Accessed on May 7, 2020 at <https://centerforthelivingcity.org/janejacobs#jane-and-the-center>
- [56] Ying-Yu Chen, Ziyue Li, Daniela Rosner, and Alexis Hiniker. 2019. Understanding Parents' Perspectives on Mealtime Technology. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 3, 1, Article 5 (March 2019), 19 pages. DOI:<https://doi.org/10.1145/3314392>
- [57] Yoram Chisik, Ferran Altarriba Bertran, Marie-Monique Schaper, Elena Márquez Segura, Laia Turmo Vidal, and Danielle Wilde. 2020. Chasing play potentials in food culture: embracing children's perspectives. In *Proceedings of the 2020 ACM Interaction Design and Children Conference: Extended Abstracts (IDC '20)*. Association for Computing Machinery, New York, NY, USA, 46–53. DOI:<https://doi.org/10.1145/3397617.3398062>
- [58] Chomko and Rosier. 2014. Shadowing. Accessed on March 29, 2021 at <https://www.playablecity.com/projects/shadowing/>
- [59] Simon Clatworthy, Robin Oorschot and Berit Lindquister. 2014, June. How to Get a Leader to Talk: Tangible Objects for Strategic Conversations in Service Design. In *ServDes. 2014 Service Future; Proceedings of the fourth Service Design and Service*

Innovation Conference; Lancaster University; United Kingdom; 9- 11 April 2014 (No. 099, pp. 270-280). Linköping University Electronic Press.

- [60] Mia Consalvo. 2009. There is no magic circle. *Games and culture*, 4(4), 408-417.
- [61] Paul Coulton, Dan Burnett & Adrian Ioan Gradinar. 2016. Games as speculative design: allowing players to consider alternate presents and plausible futures. *DRS 2016*. DOI: [10.21606/drs.2016.15](https://doi.org/10.21606/drs.2016.15)
- [62] Andy Crabtree. 2004. Design in the absence of practice: breaching experiments. In *Proceedings of the 5th conference on Designing interactive systems: processes, practices, methods, and techniques* (DIS '04). Association for Computing Machinery, New York, NY, USA, 59–68. DOI:<https://doi.org/10.1145/1013115.1013125>
- [63] Andrew Crabtree, Mark Rouncefield and Peter Tolmie. 2012. Doing design ethnography. Springer Science & Business Media.
- [64] Simon Critchley. 2018. Being outside of yourself. *NewPhilosopher*, Issue 20 (May-June).
- [65] Nigel Cross. 1982. Designerly ways of knowing. *Design studies*, 3(4), 221-227.
- [66] Mihaly Csikszentmihalyi. 1990. *Flow: The psychology of optimal experience* (Vol. 1990). New York: Harper & Row.
- [67] Ella Dagan, Elena Márquez Segura, Ferran Altarriba Bertran, Miguel Flores, and Katherine Isbister. 2019. Designing 'True Colors': A Social Wearable that Affords Vulnerability. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, Paper 33, 1–14. DOI:<https://doi.org/10.1145/3290605.3300263>
- [68] Nils Dahlbäck, Arne Jönsson, and Lars Ahrenberg. 1993. Wizard of Oz studies: why and how. In *Proceedings of the 1st international conference on Intelligent user interfaces* (IUI '93). Association for Computing Machinery, New York, NY, USA, 193–200. DOI:<https://doi.org/10.1145/169891.169968>
- [69] Peter Dalsgaard and Christian Dindler. 2014. Between theory and practice: bridging concepts in HCI research. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '14). Association for Computing Machinery, New York, NY, USA, 1635–1644. DOI:<https://doi.org/10.1145/2556288.2557342>
- [70] Renata Paola Dameri & Camille Rosenthal-Sabroux. (Eds.). 2014. Smart city: How to create public and economic value with high technology in urban space. Springer.

- [71] Pranav Dandekar, Ashish Goel & David T. Lee. 2013. Biased assimilation, homophily, and the dynamics of polarization. *Proceedings of the National Academy of Sciences*, 110(15), 5791-5796.
- [72] Karin Danielsson & Charlotte Wiberg. 2006. Participatory design of learning media: Designing educational computer games with and for teenagers. *Interactive Technology and Smart Education*.
- [73] Hilary Davis, Hasan Shahid Ferdous, and Frank Vetere. 2017. 'Table Manners': Children's Use of Mobile Technologies in Family-friendly Restaurants. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, 969–978. DOI:<https://doi.org/10.1145/3027063.3053353>
- [74] Bernie DeKoven. 2020. *The Infinite Playground: A Player's Guide to Imagination*. MIT Press.
- [75] Michiel de Lange. 2019. The playful city: Citizens making the smart city. *The Playful Citizen*, 349.
- [76] Sebastian Deterding. 2009. The game frame: Systemizing a goffmanian approach to video game theory. In *DiGRA Conference '09*.
- [77] Sebastian Deterding. 2012. Gamification: designing for motivation. *interactions* 19, 4 (July + August 2012), 14–17. DOI:<https://doi.org/10.1145/2212877.2212883>
- [78] Sebastian Deterding. 2013. *Modes of play: A frame analytic account of video game play* (Doctoral dissertation, Staats-und Universitätsbibliothek Hamburg Carl von Ossietzky).
- [79] Kristin N. Dew, & Daniela K. Rosner. 2018, April. Lessons from the woodshop: Cultivating design with living materials. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-12).
- [80] Katerina Diamantaki, Charalampos Rizopoulos, Vasileios Tsetsos, Iulianos Theona, Dimitris Charitos, & Nikos Kaimakamis. 2013, July. Integrating game elements for increasing engagement and enhancing User Experience in a smart city context. In *Intelligent Environments (Workshops)* (pp. 160-171).
- [81] Markéta Dolejšová, Hilary Davis, Ferran Altarriba Bertran and Danielle Wilde. 2020. Feeding the Futures of Human-Food Interaction. *interactions* 27, 5 . (September - October 2020), 34–39. DOI:<https://doi.org/10.1145/3414471>

- [82] Markéta Dolejšová\*, Danielle Wilde\*, Ferran Altarriba Bertran and Hilary Davis. 2020. Disrupting (More-than-) Human-Food Interaction: Experimental Design, Tangibles and Food-Tech Futures. In *Proceedings of the 2020 ACM on Designing Interactive Systems Conference (DIS '20)*. Association for Computing Machinery, New York, NY, USA, 993–1004. DOI:<https://doi.org/10.1145/3357236.3395437> (\* joint first-authors)
- [83] Mary Douglas. 1972. Deciphering a meal. *Daedalus*, 61-81.
- [84] Steven Dow, Blair MacIntyre, Jaemin Lee, Christopher Oezbek, Jay David Bolter, and Maribeth Gandy. 2005. Wizard of Oz support throughout an iterative design process. *IEEE Pervasive Computing*, 4(4), 18-26.
- [85] Allisson Druin. 2002. The role of children in the design of new technology. *Behaviour and information technology*, 21(1), 1-25.
- [86] Jared Duval, Ferran Altarriba Bertran, Siying Chen, Melissa Chu, Divya Subramonian, Austin Wang, Geoffrey Xiang, Sri Kurniawan, and Katherine Isbister. 2021. Chasing Play on TikTok from Populations with Disabilities to Inspire Playful and Inclusive Technology Design. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, Article 492, 1–15. DOI:<https://doi.org/10.1145/3411764.3445303>
- [87] Pelle Ehn, Elisabet M. Nilsson & Richard Topgaard. 2014. *Making futures: Marginal notes on innovation, design, and democracy*. The MIT Press.
- [88] Pelle Ehn. 2017. Scandinavian design: On participation and skill. In *Participatory design* (pp. 41-77). CRC Press.
- [89] Carolyn Ellis, Tony E. Adams, & Arthur P. Bochner. 2011. Autoethnography: an overview. *Historical social research/Historische sozialforschung*, 273-290.
- [90] Chris Elsdén, David Chatting, Abigail C. Durrant, Andrew Garbett, Bettina Nissen, John Vines, and David S. Kirk. 2017. On Speculative Enactments. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, 5386–5399. DOI:<https://doi.org/10.1145/3025453.3025503>
- [91] Sandro Engel and Amelie Kunzler. 2012. *StreetPong*. Retrieved on November 16, 2018 from <http://www.streetpong.info>.
- [92] Engineering and Physical Sciences Research Council (EPSRC). (N.d). *The Equator Project*. Accessed on May 7, 2020 at <https://web.archive.org/web/20120702141940/http://www.equator.ac.uk/>

- [93] Estudio Guto Requena. 2015. Light creature: interactive facade as a visual soundscape reflection of São Paulo's iconic avenue. Accessed on March 29, 2021 at <https://en.gutorequena.com/lightcreature-en/>
- [94] Daniel Fallman. 2003. Design-oriented human-computer interaction. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 225-232).
- [95] Hasan Shahid Ferdous, Bernd Ploderer, Hilary Davis, Frank Vetere, and Kenton O'Hara. 2015. Pairing Technology and Meals: A Contextual Enquiry in the Family Household. In *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction (OzCHI '15)*. Association for Computing Machinery, New York, NY, USA, 370–379. DOI:<https://doi.org/10.1145/2838739.2838780>
- [96] Hasan Shahid Ferdous, Bernd Ploderer, Hilary Davis, Frank Vetere, and Kenton O'hara. 2016. Commensality and the Social Use of Technology during Family Mealtime. *ACM Trans. Comput.-Hum. Interact.* 23, 6, Article 37 (December 2016), 26 pages. DOI:<https://doi.org/10.1145/2994146>
- [97] Hasan Shahid Ferdous, Frank Vetere, Hilary Davis, Bernd Ploderer, Kenton O'Hara, Rob Comber, and Jeremy Farr-Wharton. 2017. Celebratory Technology to Orchestrate the Sharing of Devices and Stories during Family Mealtimes. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, 6960–6972. DOI:<https://doi.org/10.1145/3025453.3025492>
- [98] Patrick Tobias Fischer, Christian Zöllner, Eva Hornecker. 2010. VR/Urban: Spread.gun— design process and challenges in developing a shared encounter for media façades. In: *Proceedings of British HCI 2010, BCS eWiC series*, pp. 289–298. British Computer Society/ACM NY
- [99] Lois Frankel & Martin Racine. 2010. The complex field of research: For design, through design, and about design.
- [100] Christopher Frayling. 1993. *Research in art and design* (Vol. 1, No. 1, pp. 1-5). London: Royal College of Art.
- [101] Tracy Fullerton. 2019. *Game design workshop: a playcentric approach to creating innovative games*. AK Peters/CRC Press.
- [102] Traci L. Galinsky, Roger R. Rosa, Joel S. Warm, and William N. Dember. 1993. Psychophysical determinants of stress in sustained attention. *Human Factors*, 35(4):603-614.

- [103] Sarah Gallacher, Jenny O'Connor, Jon Bird, Yvonne Rogers, Licia Capra, Daniel Harrison, and Paul Marshall. 2015. Mood Squeezer: Lightening up the Workplace through Playful and Lightweight Interactions. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing (CSCW '15)*. Association for Computing Machinery, New York, NY, USA, 891–902. DOI:<https://doi.org/10.1145/2675133.2675170>
- [104] Oscar García, Pablo Chamoso, Javier Prieto, Sara Rodríguez, & Fernando de la Prieta. 2017, June. A serious game to reduce consumption in smart buildings. In *International Conference on Practical Applications of Agents and Multi-Agent Systems* (pp. 481-493). Springer, Cham.
- [105] Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. Design: Cultural probes. *interactions* 6, 1 (Jan./Feb. 1999), 21–29. DOI:<https://doi.org/10.1145/291224.291235>
- [106] William Gaver. 2002. Designing for homo ludens. *I3 Magazine*, 12(June), 2-6.
- [107] William Gaver, Jacob Beaver & Steve Benford. 2003. Ambiguity as a resource for design. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 233-240).
- [108] William Gaver, Andrew Boucher, Sarah Pennington, and Brendan Walker. 2004. Cultural probes and the value of uncertainty. *interactions* 11, 5 (September + October 2004), 53–56. DOI:<https://doi.org/10.1145/1015530.1015555>
- [109] William W. Gaver, John Bowers, Andrew Boucher, Hans Gellerson, Sarah Pennington, Albrecht Schmidt, Anthony Steed, Nicholas Villars, and Brendan Walker. 2004. The drift table: designing for ludic engagement. In *CHI '04 Extended Abstracts on Human Factors in Computing Systems (CHI EA '04)*. Association for Computing Machinery, New York, NY, USA, 885–900. DOI:<https://doi.org/10.1145/985921.985947>
- [110] William Gaver. 2007. Cultural commentators: Non-native interpretations as resources for polyphonic assessment. *International journal of human-computer studies* 65, 4 (2007), 292–305
- [111] William Gaver. 2011. Making spaces: how design workbooks work. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, 1551–1560. DOI:<https://doi.org/10.1145/1978942.1979169>
- [112] William Gaver. 2012. What should we expect from research through design?. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 937-946).

- [113] William Gaver. 2015. Homo ludens (subspecies politikos). In *The gameful world: Approaches, issues, applications*, Sebastian Deterding and Steffen P. Walz (Eds.). MIT Press Cambridge, MA.
- [114] William Gaver, Andy Boucher, Michail Vanis, Andy Sheen, Dean Brown, Liliana Ovalle, Naho Matsuda, Amina Abbas-Nazari, and Robert Phillips. 2019. My Naturewatch Camera: Disseminating Practice Research with a Cheap and Easy DIY Design. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, Paper 302, 1–13. DOI:<https://doi.org/10.1145/3290605.3300532>
- [115] Anni Gentes, Aude Guyot-Mbodji, & Isabelle Demeure. 2010. Gaming on the move: urban experience as a new paradigm for mobile pervasive game design. *Multimedia systems*, 16(1), 43-55.
- [116] Elisa Giaccardi & Johan Redström. 2020. Technology and more-than-human design. *Design Issues*, 36(4), 33-44.
- [117] René Glas, Sybille Lammes, Michiel de Lange, Joost Raessens, and Imar de Vries (eds.). 2019. *The Playful Citizen*. Amsterdam University Press.
- [118] Ervin Goffman. 1974. *Frame analysis: An essay on the organization of experience*. Harvard University Press.
- [119] Melissa Gregg. 2013. *Work's intimacy*. John Wiley & Sons.
- [120] Andrea Grimes and Richard Harper. 2008. Celebratory technology: new directions for food research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '08)*. Association for Computing Machinery, New York, NY, USA, 467–476. DOI:<https://doi.org/10.1145/1357054.1357130>
- [121] Begoña Gros. 2007. Digital games in education: The design of games-based learning environments. *Journal of research on technology in education*, 40(1), 23-38.
- [122] Giuseppe Grossi & Daniela Pianezzi. 2017. Smart cities: Utopia or neoliberal ideology?. *Cities*, 69, 79-85.
- [123] Greg Guest, Kathleen M. MacQueen, and Emily E. Namey. 2011. *Applied thematic analysis*. Sage Publications.
- [124] Luther Halsey Gulick. 1920. *A philosophy of play*. C. Scribner's Sons.

- [125] Lars Hallnäs and Johan Redström. 2001. Slow Technology – Designing for Reflection. *Personal Ubiquitous Comput.* 5, 3 (August 2001), 201–212.  
DOI:https://doi.org/10.1007/PL00000019
- [126] Kim Halskov. & Nicolai Brodersen Hansen. 2015. The diversity of participatory design research practice at PDC 2002–2012. *International Journal of Human-Computer Studies*, 74, 81-92.
- [127] Deepi Harish. 2017. #foodporn is changing the way millennials eat. *Huffington Post*.
- [128] Mads Hoby. 2014. *Designing for Homo Explorens: open social play in performative frames* (Doctoral dissertation, Malmö University, Faculty of Culture and Society).
- [129] Victoria Hollis, Artie Konrad, Aaron Springer, Matthew Antoun, Cristopher Antoun, Rob Martin & Steve Whittaker. 2017. What does all this data mean for my future mood? Actionable analytics and targeted reflection for emotional well-being. *Human-Computer Interaction*, 32(5-6), 208-267.
- [130] Kristina Höök, Baptiste Caramiaux, Cumhur Erkut, Jodi Forlizzi, Nasrin Hajinejad, Michael Haller, Caroline Hummels, Katherine Isbister, Martin Jonsson, George Khut, Lian Loke, Danielle Lottridge, Patrizia Marti, Edward Melcer, Florian Floyd Müller, Marianne Graves Petersen, Thecla Schiphorst, Elena Márquez Segura, Anna Ståhl, Dag Svanæs, Jakob Tholander and Helena Tobiasson. 2018. Embracing first-person perspectives in soma-based design. In *Informatics* (Vol. 5, No. 1, p. 8). Multidisciplinary Digital Publishing Institute.
- [131] Kristina Höök, Martin P. Jonsson, Anna Ståhl, & Johanna Mercurio. 2016. Somaesthetic appreciation design. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 3131-3142).
- [132] Kristina Höök & Jonas Löwgren. 2012. Strong concepts: Intermediate-level knowledge in interaction design research. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 19(3), 1-18.
- [133] Michael A. Horan and John E. Clague. 1999. Injury in the aging: recovery and rehabilitation. *British Medical Bulletin* 55, 4: 895–909.
- [134] Johan Huizinga. 1950. *Homo Ludens: A Study of the Play Element in Culture*. Beacon Press
- [135] Robin Hunicke, Mark LeBlanc & Robert Zubek. 2004. MDA: A formal approach to game design and game research. In *Proceedings of the AAAI Workshop on Challenges in Game AI* (Vol. 4, No. 1, p. 1722).

- [136] Hilary Hutchinson, Wendy Mackay, Bo Westerlund, Benjamin B. Bederson, Allison Druin, Catherine Plaisant, Michel Beaudouin-Lafon, Stéphane Conversy, Helen Evans, Heiko Hansen, Nicolas Roussel, and Björn Eiderbäck. 2003. Technology probes: inspiring design for and with families. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '03)*. Association for Computing Machinery, New York, NY, USA, 17–24. DOI:<https://doi.org/10.1145/642611.642616>
- [137] Interaction Research Studio. 2020. *Yo-Yo Machines*. Accessed at <https://www.yoyomachines.io/> on July 12, 2021.
- [138] Katherine Isbister & Noah Schaffer. 2008. *Game usability: Advancing the player experience*. CRC press.
- [139] Katherine Isbister and Kristina Höök. 2009. On being supple: in search of rigor without rigidity in meeting new design and evaluation challenges for HCI practitioners. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '09)*. Association for Computing Machinery, New York, NY, USA, 2233–2242. DOI:<https://doi.org/10.1145/1518701.1519042>
- [140] Katherine Isbister. 2011. Emotion and motion: games as inspiration for shaping the future of interface. *Interactions*, 18(5), 24-27.
- [141] Katherine Isbister. 2016. *How games move us: Emotion by design*. Mit Press.
- [142] Katherine Isbister, Elena Márquez Segura, and Edward F. Melcer. 2018. Social Affordances at Play: Game Design Toward Socio-Technical Innovation. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, Paper 372, 1–10. DOI:<https://doi.org/10.1145/3173574.3173946>
- [143] Brigitte Jordan & Austin Henderson. 1995. Interaction analysis: Foundations and practice. *The journal of the learning sciences*, 4(1), 39-103.
- [144] Carl G. Jung. 1998. Psychological types. *Critical Concepts in Psychology*, 28-39.
- [145] Steven L. Kent. 2010. *The Ultimate History of Video Games: from Pong to Pokemon and beyond... the story behind the craze that touched our lives and changed the world (Vol. 1)*. Crown.
- [146] Rilla Khaled & Asimina Vasalou. 2014. Bridging serious games and participatory design. *International Journal of Child-Computer Interaction*, 2(2), 93-100.
- [147] Druv Khullar. 2018 How social isolation is killing us. *New York Times*.

- [148] Amy Jo Kim. 2014. *Beyond Player Types: Kim's Social Action Matrix*. Accessed on June 17, 2021 at <https://amyjokim.com/>
- [149] Suzanne Kirkpatrick, Nien Lam, & Jamie Lin. 2011. Commons: A game for urban communities to improve their city through citizen stewardship. Accessed on September 24, 2020 at <http://civictripod.com/civictripod.com/games/commons/index.html>
- [150] Laboratory for Architectural Experiments. 2015. Urbanimals. Accessed on March 29, 2021 at [http://lax.com.pl/portfolio\\_page/urbanimals/](http://lax.com.pl/portfolio_page/urbanimals/)
- [151] Filip Lange-Nielsen, Xavier V, Lafont, Benjamin Cassar & Rilla Khaled. 2012. Involving players earlier in the game design process using cultural probes. In *Proceedings of the 4th International Conference on Fun and Games* (pp. 45-54).
- [152] Kendra Lapolla. 2014. The Pinterest project: Using social media in an undergraduate second year fashion design course at a United States University. *Art, Design & Communication in Higher Education*, 13(2), 175-187.
- [153] Nicole Lazzaro. 2004. *Why we play games: Four keys to more emotion without story*.
- [154] Nicole Lazzaro. 2009. Why we play: affect and the fun of games. *Human-computer interaction: Designing for diverse users and domains*, 155, 679-700.
- [155] Joanne Leong, Yuehan Wang, Romy Sayah, Stella Rossikopoulou Pappa, Florian Perteneder, and Hiroshi Ishii. 2019. SociaBowl: A Dynamic Table Centerpiece to Mediate Group Conversations. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems* (CHI EA '19). Association for Computing Machinery, New York, NY, USA, Paper LBW1114, 1–6. DOI:<https://doi.org/10.1145/3290607.3312775>
- [156] Rhema Linder, Clair Snodgrass & Andruid Kerne. 2014, April. Everyday ideation: all of my ideas are on pinterest. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 2411-2420).
- [157] Conor Linehan, Sabine Harrer, Ben Kirman, Shaun Lawson, and Marcus Carter. 2015. Games Against Health: A Player-Centered Design Philosophy. In *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems* (CHI EA '15). Association for Computing Machinery, New York, NY, USA, 589–600. DOI:<https://doi.org/10.1145/2702613.2732514>
- [158] Can Liu, Ben Bengler, Danilo Di Cuiá, Katie Seaborn, Giovanna Nunes Vilaza, Sarah Gallacher, Licia Capra, and Yvonne Rogers. 2018. Pinsight: A Novel Way of Creating and Sharing Digital Content through 'Things' in the Wild. In *Proceedings of the 2018 Designing Interactive Systems Conference* (DIS '18). Association for Computing

Machinery, New York, NY, USA, 1169–1181.  
DOI:<https://doi.org/10.1145/3196709.3196782>

- [159] Jonas Löwgren. 2013. Annotated portfolios and other forms of intermediate-level knowledge. *Interactions*, 20(1), 30-34.
- [160] Andrés Lucero, Evangelos Karapanos, Juha Arrasvuori, and Hannu Korhonen. 2014. Playful or Gameful?: creating delightful user experiences. *interactions* 21, 3 (May 2014), 34-39
- [161] Andrés Lucero, Audrey Desjardins, Carman Neustaedter, Kristina Höök, Marc Hassenzahl, and Marta E. Cecchinato. 2019. A Sample of One: First-Person Research Methods in HCI. In *Companion Publication of the 2019 on Designing Interactive Systems Conference 2019 Companion (DIS '19 Companion)*. Association for Computing Machinery, New York, NY, USA, 385–388. DOI:<https://doi.org/10.1145/3301019.3319996>
- [162] Andrés Lucero, Kirsikka Vaajakallio & Peter Dalsgaard. 2012. The dialogue-labs method: process, space and materials as structuring elements to spark dialogue in co-design events, *CoDesign*, 8:1, 1-23, DOI: [10.1080/15710882.2011.609888](https://doi.org/10.1080/15710882.2011.609888)
- [163] Brian Mac Namee, Pauline Rooney, Patrick Lindstrom, Andrew Ritchie, Frances Boylan, and Greg Burke. 2006. Serious Gordon: using serious games to teach food safety in the kitchen. 9th. International Conference on Computer Games: AI, Animation, Mobile, Educational and Serious Games (CGAMES06), 211-217, Dublin, 22-24 November 2006.
- [164] Elena Márquez Segura, Annika Waern, Jin Moen, and Carolina Johansson. 2013. The design space of body games: technological, physical, and social design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13)*. Association for Computing Machinery, New York, NY, USA, 3365–3374. DOI:<https://doi.org/10.1145/2470654.2466461>
- [165] Elena Márquez Segura, Laia Turmo Vidal, Asreen Rostami, and Annika Waern. 2016. Embodied Sketching. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*. Association for Computing Machinery, New York, NY, USA, 6014–6027. DOI:<https://doi.org/10.1145/2858036.2858486>
- [166] Elena Márquez Segura, Annika Waern, Luis Márquez Segura, and David López Recio. 2016. Playification: The PhySeEar case. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '16)*. Association for Computing Machinery, New York, NY, USA, 376–388. DOI:<https://doi.org/10.1145/2967934.2968099>

- [167] Elena Márquez Segura, Katherine Isbister, Jon Back, and Annika Waern. 2017. Design, appropriation, and use of technology in larps. In *Proceedings of the 12th International Conference on the Foundations of Digital Games*. ACM, 53.
- [168] Elena Márquez Segura, James Fey, Ella Dagan, Samvid Niravbhai Jhaveri, Jared Pettitt, Miguel Flores, and Katherine Isbister. 2018. Designing Future Social Wearables with Live Action Role Play (Larp) Designers. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Association for Computing Machinery, New York, NY, USA, Paper 462, 1–14.  
DOI:<https://doi.org/10.1145/3173574.317403>
- [169] Nikolas Martelaro and Wendy Ju. 2017. WoZ Way: Enabling Real-time Remote Interaction Prototyping & Observation in On-road Vehicles. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW '17)*. Association for Computing Machinery, New York, NY, USA, 169–182.  
DOI:<https://doi.org/10.1145/2998181.2998293>
- [170] Maria-Lluïsa Marsal-Llacuna, Joan Colomer-Llinàs, & Joaquim Meléndez-Frigola. 2015. Lessons in urban monitoring taken from sustainable and livable cities to better address the Smart Cities initiative. *Technological Forecasting and Social Change*, 90, 611-622.
- [171] Joe Marshall & Conor Linehan. 2017, May. Misrepresentation of health research in exertion games literature. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 4899-4910).
- [172] Emanuela Mazzone, Janet C. Read & Russell Beale. 2008. Design with and for disaffected teenagers. In *Proceedings of the 5th Nordic conference on Human-computer interaction: building bridges* (pp. 290-297).
- [173] Jane McGonigal. 2011. *Reality is broken: Why games make us better and how they can change the world*. Penguin.
- [174] Alice McIntyre. 2007. *Participatory action research* (Vol. 52). Sage Publications.
- [175] Joshua McVeigh-Schultz, Max Kreminski, Keshav Prasad, Perry Hoberman, and Scott S Fisher. 2018. Immersive Design Fiction: Using VR to Prototype Speculative Interfaces and Interaction Rituals within a Virtual Storyworld. In *Proceedings of the 2018 Designing Interactive Systems Conference*. ACM, 817–829
- [176] Yash Dhanpal Mehta, Rohit Ashok Khot, Rakesh Patibanda, and Florian 'Floyd' Mueller. 2018. Arm-A-Dine: Towards Understanding the Design of Playful Embodied Eating Experiences. In *Proceedings of the 2018 Annual Symposium on Computer-*

- Human Interaction in Play* (CHI PLAY '18). Association for Computing Machinery, New York, NY, USA, 299–313. DOI:<https://doi.org/10.1145/3242671.3242710>
- [177] David R. Michael & Sandra L. Chen. 2005. *Serious games: Games that educate, train, and inform*. Muska & Lipman/Premier-Trade.
- [178] Robb Mitchell, Alexandra Papadimitriou, Youran You, and Laurens Boer. 2015. Really eating together: a kinetic table to synchronise social dining experiences. In *Proceedings of the 6th Augmented Human International Conference (AH '15)*. Association for Computing Machinery, New York, NY, USA, 173–174. DOI:<https://doi.org/10.1145/2735711.2735822>
- [179] Luca Mora, Roberto Bolici, & Mark Deakin. 2017. The first two decades of smart-city research: A bibliometric analysis. *Journal of Urban Technology*, 24(1), 3-27.
- [180] Evgeny Morozov. 2013. *To save everything, click here: The folly of technological solutionism*. Public Affairs.
- [181] Evgeny Morozov & Francesca Bria. 2018. *Rethinking the smart city*. New York: Rosa Luxemburg Stiftung.
- [182] Carol Moser, Sarita Y. Schoenebeck, and Katharina Reinecke. 2016. Technology at the Table: Attitudes about Mobile Phone Use at Mealtimes. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, New York, NY, USA, 1881–1892. DOI:<https://doi.org/10.1145/2858036.2858357>
- [183] Florian 'Floyd' Mueller, Yan Wang, Zhuying Li, Tuomas Kari, Peter Arnold, Yash Dhanpal Mehta, Jonathan Marquez, and Rohit Ashok Khot. 2020. Towards Experiencing Eating as Play. In *Proceedings of the Fourteenth International Conference on Tangible, Embedded, and Embodied Interaction (TEI '20)*. Association for Computing Machinery, New York, NY, USA, 239–253. DOI:<https://doi.org/10.1145/3374920.3374930>
- [184] Michael J. Muller. 2007. *Participatory design: the third space in HCI* (pp. 1087-1108). CRC press.
- [185] Lisa P. Nathan, Eli Blevis, Batya Friedman, Jay Hasbrouck, and Phoebe Sengers. 2008. Beyond the hype: sustainability & HCI. In *CHI '08 Extended Abstracts on Human Factors in Computing Systems (CHI EA '08)*. Association for Computing Machinery, New York, NY, USA, 2273–2276. DOI:<https://doi.org/10.1145/1358628.1358667>
- [186] Niantic. (N.d). Pokémon Go. Accessed on May 7, 2020 at [www.pokemongo.com](http://www.pokemongo.com)

- [187] Iohanna Nicenboim, Elisa Giaccardi, Marie Louise Juul Søndergaard, Anuradha Venugopal Reddy, Yolande Strengers, James Pierce, and Johan Redström. 2020. More-Than-Human Design and AI: In Conversation with Agents. In *Companion Publication of the 2020 ACM Designing Interactive Systems Conference (DIS' 20 Companion)*. Association for Computing Machinery, New York, NY, USA, 397–400. DOI:<https://doi.org/10.1145/3393914.3395912>
- [188] Scott Nicholson. 2015. A recipe for meaningful gamification. In *Gamification in education and business* (pp. 1-20). Springer, Cham.
- [189] Anton Nijholt (ed.). 2017. *Playable cities*. Singapore: Springer.
- [190] Casey O'Donnell. 2014. Getting played: Gamification and the rise of algorithmic surveillance. *Surveillance & Society*, 12(3), 349-359.
- [191] Julian Oliver and Danja Vasiliev. 2011. *Newstweek*. Retrieved on November 12, 2018 from <https://newstweek.com>.
- [192] Rita Orji, Julita Vassileva, and Regan L. Mandryk. 2013. LunchTime: a slow-casual game for longterm dietary behavior change. *Personal Ubiquitous Comput.* 17, 6 (August 2013), 1211-1221.
- [193] Feargus O'Sullivan. 2020. Barcelona Will Supersize its Car-Free 'Superblocks'. In *bloomberg.com*. Accessed on January 18, 2021 at <https://www.bloomberg.com/news/articles/2020-11-11/barcelona-s-new-car-free-superblock-will-be-big>
- [194] PAN Studio, T. Armitage, and G. Galik. 2013. *About Hello Lamp Post*. Accessed on March 29, 2021 at <http://www.hellolamppost.co.uk/about>
- [195] Joongsin Park, Bon-chang Koo, Jundong Cho, and Byung-Chull Bae. 2015. SnackBreaker: A Game Promoting Healthy Choice of Snack Foods. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play*. ACM, 673– 678.
- [196] Celia Pearce. 2006. Productive play: Game culture from the bottom up. *Games and Culture*, 1(1), 17-24.
- [197] Michel Peeters, Carl Megens, Elise van den Hoven, Caroline Hummels, and Aarnout Brombacher. 2013. Social stairs: taking the piano staircase towards long-term behavioral change. In *International Conference on Persuasive Technology* (pp. 174-179). Springer, Berlin, Heidelberg.

- [198] Ash Perrin. 2018. The Power of Play. TEDx Talks. Retrieved on November 30, 2018 from <https://www.youtube.com/watch?v=VNAtVKLxjnA>.
- [199] Alexandra Pometko, Ella Dagan, Ferran Altarriba Bertran, and Katherine Isbister. 2021. Drawing From Social Media to Inspire Increasingly Playful and Social Drone Futures. In *Designing Interactive Systems Conference 2021 (DIS '21)*. Association for Computing Machinery, New York, NY, USA, 697–706. DOI:<https://doi.org/10.1145/3461778.3462020>
- [200] Jessie P. Rey. 2015. Gamification and post-fordist capitalism. *The gameful world: Approaches, issues, applications*, 277-296.
- [201] Holly Robbins and Katherine Isbister. 2014. Pixel motion: A surveillance camera-enabled public digital game. In *FDG*.
- [202] Yvonne Rogers. 2011. Interaction design gone wild: striving for wild theory. *interactions* 18, 4 (July + August 2011), 58–62. DOI:<https://doi.org/10.1145/1978822.1978834>
- [203] Doris C. Rusch. 2017. *Making deep games: Designing games with meaning and purpose*. CRC Press.
- [204] Tracii Ryan, Kelly A. Allen, DeLeon L. Gray & Dennis M. McInerney. 2017. How social are social media? A review of online social behaviour and connectedness. *Journal of Relationships Research*, 8.
- [205] Merja Ryöppy, Patricia Lima, and Jacob Buur. 2015. Design Participation as Postdramatic Theatre. In *4th Participatory Innovation Conference 2015* (p. 47).
- [206] Manaswi Saha, Kotaro Hara, Soheil Behnezhad, Anthony Li, Michael Saugstad, Hanuma Maddali, Sage Chen, and Jon E. Froehlich. 2017. A Pilot Deployment of an Online Tool for Large-Scale Virtual Auditing of Urban Accessibility. In *Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '17)*. Association for Computing Machinery, New York, NY, USA, 305–306. DOI:<https://doi.org/10.1145/3132525.3134775>
- [207] Katie Salen & Eric Zimmerman. 2004. *Rules of play: Game design fundamentals*. MIT press.
- [208] Tony Salvador, John W. Sherry, & Alvaro E. Urrutia. 2005. Less cyber, more café: enhancing existing small businesses across the digital divide with ICTs. *Inf. Technol. Dev.* 11(1), 77–95 (2005).

- [209] Eric Sanchez, Shawn Young & Caroline Jouneau-Sion. 2017. Classcraft: from gamification to ludicization of classroom management. *Education and Information Technologies*, 22(2), 497-513.
- [210] Elizabeth B. N. Sanders & Pieter Jan Stappers. 2008. Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18.
- [211] Jesse Schell. 2008. *The Art of Game Design: A book of lenses*. CRC press.
- [212] Donald A. Schön. 1988. *The reflective practitioner*. New York, 1983.
- [213] Ben Schouten, Gabriele Ferri, Michiel de Lange, and Karel Millenaar (eds.). 2017. Games as strong concepts for city-making. In *Playable Cities* (pp. 23-45). Springer, Singapore.
- [214] Aaron Scott. 2014. Meaningful play: how play centric research methods are contributing to new understanding and opportunities for design. In *The Routledge companion to design research*, pages 416–430. Routledge.
- [215] Phoebe Sengers, and Bill Gaver. 2006, June. Staying open to interpretation: engaging multiple meanings in design and evaluation. In *Proceedings of the 6th conference on Designing Interactive systems* (pp. 99- 108). ACM.
- [216] Kieran Setiya. 2017. *Midlife: A Philosophical Guide*. Princeton University Press.
- [217] John Sharp and David Thomas. 2019. *Fun, Taste, & Games: An Aesthetics of the Idle, Unproductive, and Otherwise Playful*. MIT Press.
- [218] Miguel Sicart. 2014. *Play matters*. MIT Press.
- [219] Anjeli Singh and Sareeka Malhotra. 2013. A researcher's guide to running diary studies. In *Proceedings of the 11th Asia Pacific Conference on Computer Human Interaction (APCHI '13)*. Association for Computing Machinery, New York, NY, USA, 296–300. DOI:<https://doi.org/10.1145/2525194.2525261>
- [220] Bhagya Nathali Silva, Murad Khan, & Kijun Han. 2018. Towards sustainable smart cities: A review of trends, architectures, components, and open challenges in smart cities. *Sustainable Cities and Society*, 38, 697-713.
- [221] Nina Simon. 2010. *The participatory museum*. Museum 2.0.
- [222] Dewi Simon. 2016. *Dinner with twenty fellow travellers*. Retrieved on January 2, 2019 from <https://blog.klm.com/dinner-with-twenty-fellow-travellers/>

- [223] Petr Slovák, Nikki Theofanopoulou, Alessia Cecchet, Peter Cottrell, Ferran Altarriba Bertran, Ella Dagan, Julian Childs, and Katherine Isbister. 2018. "I just let him cry...: Designing Socio-Technical Interventions in Families to Prevent Mental Health Disorders. *Proc. ACM Hum.-Comput. Interact.* 2, CSCW, Article 160 (November 2018), 34 pages. DOI:<https://doi.org/10.1145/3274429>
- [224] Ed Smith. 2018. Play like a child. *NewPhilosopher*, Issue 20(May-June).
- [225] Aaron Smuts. 2005. Are Video Games Art?. *Contemporary Aesthetics (Journal)*, 3(1), 6.
- [226] Softbank Robotics. 2018. Who is NAO?. *SoftBank Robotics*, 2018. <https://www.softbankrobotics.com/emea/en/robots/nao>.
- [227] Olli Sotamaa. 2005. Creative user-centered design practices: lessons from game cultures. In *Everyday innovators* (pp. 104-116). Springer, Dordrecht.
- [228] Henrik Sproedt. 2012. *Play. Learn. Innovate: Grasping the Social Dynamics of Participatory Innovation*. BoD—Books on Demand.
- [229] Jaakko Stenros. 2014. In defence of a magic circle: the social, mental and cultural boundaries of play. *Transactions of the Digital Games Research Association*, 1(2).
- [230] Quentin Stevens. 2007. *The Ludic city: exploring the potential of public spaces*. Routledge.
- [231] Bernard Suits. 1978. *The Grasshopper: Games, Life, and Utopia*.
- [232] Pekka Sulkunen. 2009. *The saturated society: Governing risk & lifestyles in consumer culture*. Sage Publications.
- [233] Brian Sutton-Smith. 2009. *The ambiguity of play*. Harvard University Press.
- [234] Lee Taber & Steve Whittaker. 2018. Personality depends on the medium: Differences in self-perception on Snapchat, Facebook and offline. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-13).
- [235] Tess Tanenbaum, Karen Tanenbaum, and Ron Wakkary. 2012. Design fictions. In *Proceedings of the Sixth International Conference on Tangible, Embedded and Embodied Interaction (TEI '12)*. Association for Computing Machinery, New York, NY, USA, 347–350. DOI:<https://doi.org/10.1145/2148131.2148214>

- [236] Hamish Tennent, Wen-Ying Lee, Yoyo Tsung-Yu Hou, Ilan Mandel, and Malte Jung. 2018. PAPERINO: Remote Wizard-Of-Oz Puppeteering For Social Robot Behaviour Design. In *Companion of the 2018 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW '18)*. Association for Computing Machinery, New York, NY, USA, 29–32. DOI:<https://doi.org/10.1145/3272973.3272994>
- [237] Mattia Thibault. 2017. Play as a modelling system-A semiotic analysis of the overreaching prestige of games. In *GamiFIN* (pp. 105-110).
- [238] Mattia Thibault. 2019, January. Towards a typology of urban gamification. In *Proceedings of the 52nd Hawaii International Conference on System Sciences*.
- [239] Douglas Thomas & John Seely Brown. 2011. A new culture of learning. *Issue Eleven | September 2014, 10*.
- [240] Debbe Thompson, Tom Baranowski, Richard Buday, Janice Baranowski, Victoria Thompson, Russell Jago & Melissa Juliano Griffith. (2010). Serious video games for health: How behavioral science guided the development of a serious video game. *Simulation & gaming, 41(4)*, 587-606.
- [241] Rob Tieben, Tilde Bekker, & Ben Schouten. 2011. Curiosity and interaction: making people curious through interactive systems. In *Proceedings of HCI 2011 The 25th BCS Conference on Human Computer Interaction 25* (pp. 361-370).
- [242] Gustavo F. Tondello, Rina R. Wehbe, Lisa Diamond, Marc Busch, Andrzej Marczewski, and Lennart E. Nacke. 2016. The Gamification User Types Hexad Scale. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '16)*. Association for Computing Machinery, New York, NY, USA, 229–243. DOI:<https://doi.org/10.1145/2967934.2968082>
- [243] Alfonso Troisi, Sergio Belsanti, Anna Rosaria Bucci, Cristina Mosco, Fabiola Sinti, and Monica Verucci. 2000. Affect regulation in alexithymia: an ethological study of displacement behavior during psychiatric interviews. *The Journal of nervous and mental disease, 188(1)*:13-18.
- [244] Laia Turmo Vidal and Elena Márquez Segura. 2018. Documenting the Elusive and Ephemeral in Embodied Design Ideation Activities. *Multimodal Technologies and Interaction 2, 3* (2018), 35.
- [245] Annika Waern and Jon Back. 2017. Activity as the Ultimate Particular of Interaction Design. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, New York, NY, USA, 3390–3402. DOI:<https://doi.org/10.1145/3025453.3025990>

- [246] Steffen P. Walz, & Sebastian Deterding. (Eds.). 2014. *The gameful world: Approaches, issues, applications*. Mit Press.
- [247] Yan Wang, Zhuying Li, Robert S. Jarvis, Angelina Russo, Rohit Ashok Khot, and Florian 'Floyd' Mueller. 2019. Towards Understanding the Design of Playful Gustosonic Experiences with Ice Cream. In *Proceedings of the Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '19)*. Association for Computing Machinery, New York, NY, USA, 239–251. DOI:<https://doi.org/10.1145/3311350.3347194>
- [248] Danielle Wilde & Ferran Altarriba Bertran. 2019. Participatory Research through Gastronomy Design: a designerly move towards more playful gastronomy. *International Journal of Food Design*, 4(1), 3-37.
- [249] Danielle Wilde, Jenny Underwood, and Rebecca Pohlner. 2014. PKI: crafting critical design. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14)*. Association for Computing Machinery, New York, NY, USA, 365–374. DOI:<https://doi.org/10.1145/2598510.2598603>
- [250] Kevin Werbach & Dan Hunter. 2012. *For the win: How game thinking can revolutionize your business*. Wharton digital press.
- [251] John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '07)*. Association for Computing Machinery, New York, NY, USA, 493–502. DOI:<https://doi.org/10.1145/1240624.1240704>
- [252] John Zimmerman & Jodi Forlizzi. 2017. Speed dating: providing a menu of possible futures. *She Ji: The Journal of Design, Economics, and Innovation*, 3(1), 30-50.
- [253] Eric Zimmerman. 2015. Manifesto for a ludic century. *The gameful world: Approaches, issues, applications*, 19-22.