Designing the Connected Everyday

Elisa Giaccardi, Delft University of Technology

Insights

- The next generation of digital networks must be arranged around practices in the physical world, not just layered on top of them.
- Designing the connected everyday is fundamentally about making things commensurate as much as it is about making them smart.

How often have you found yourself interacting online at the dinner table? Our daily routines often incorporate tweeting, facebooking, and the use of other online platforms while in the company of friends.

Yet from Silicon Valley to Amsterdam, friends sometimes stack their phones on the table to stop this behavior while dining out. This example of “social norming” speaks of the gap between interactions online and interactions in everyday life. It also speaks of our inability as designers to imagine less intrusive ways in which digital technologies can be integrated into our lives.

Digital technologies have opened

up unprecedented opportunities for communication and interaction, but how can we make them fit more neatly around our lives?

Many companies realize this need and are exploring solutions such as glasses, watches, and a menagerie of smart devices. These devices will allow Facebook or Twitter notifications (or whatever other notifications we will receive in the future) to appear “discreetly” as an icon in the corner of our eyesight, or on our wrist, rather than on our phones. This is not what I am concerned with.

Instead, my question of how digital technologies can fit more neatly around our lives is a question of how we can

DESIGN EXPLORATION #1

Personalized with strong sensorial and aesthetic qualities, everyday objects can begin to provide an additional texture for communication and interaction through a growing patina of readable codes and patterns entangled with digital data [1].

Chiocciola (snail in Italian) is a concept that emphasizes physical effort and expressivity in the production of material traces. *Chiocciola* allows pictures of family moments around the kitchen table, or the laughs caught when the table was first used at a party, to be added to the object itself and in this way to become digitally accessible via a deliberate, repeated marking of important social moments.

InSpiro is a concept that emphasizes the role of time and repetitive movement in the creation of material traces. Contrary to *Chiocciola*, *InSpiro* is the concept of a suitcase slowly and “unintentionally” growing a decorative pattern of memories as it gets used. As in *Chiocciola*, the pattern is entangled with digital data.

In both concepts, codes and patterns are not just markers. Objects are not what they used to be: They are partly physical artifact and partly data. Codes and patterns thus are an aesthetic resource for design, which uses material traces as a metaphor for a newly developed “maturity” of the object.

facilitate meaningful opportunities for communication and interaction—not just a question of how digital technologies can make our lives more effective. It is a fundamental design question about the kind of life we want to live: one where we often feel overloaded, distracted, and fractured in our social engagements, with notifications that pull us away from our lives and sometimes from the things we really want to be doing. Or the kind of life where the ability to connect across networks is *commensurate* with our current practices in the physical world.

According to Internet World Stats, more than two billion people use the Internet today to share data and communicate through different online media. Cisco predicts there will be 25 billion devices connected to the Internet by 2015, and 50 billion by 2020. As reported by Intel, cars will account for more than 23 million connected devices by 2016. This means a growing portion of the connected devices we will use to communicate and interact will be everyday objects—“things.”

So what will we do when our shoes won’t stop chatting with each other, or talking back to us about getting some exercise? (I can’t even imagine how gossipy shoes will be!) What will be the solution then? Piling them outside the door before entering a restaurant or going to the movies?

My answer is this: In order to design digital networks that integrate meaningfully into our everyday lives, we need to learn how to design for *commensurability*. That is, we need to make our ability to connect to people and things across networks commensurate with our practices in the physical world. Now bear with me, and hold on to this term *commensurability*. I will return to this idea in a moment.

Ten years ago, I was investigating early forms of social networking and sharing of user-generated content at CU Boulder in the U.S. The project’s goals were to address the growing

DESIGN EXPLORATION #2

Geist is a family of connected objects for people living outside their native country. This concept rethinks the connection of digital and physical material flows in everyday practices of “nesting,” that is, the procuring of artifacts from home countries to maintain family values and social relations.

Geist consists of the Radio, the Clock, and the Calendar. These are everyday objects that help expat families develop a sense of connectedness and belonging through ordinary nesting practices. A “seed” is left in the home country to serve as the outpost of the family. It is a transponder, which sets GPS coordinates as point of reference for the *Geist* objects.

By adjusting the knob of the Radio to enlarge or reduce the radius of the seed, a family can decide whether to be connected to their former home, broaden the connection to their country of origin, or connect to the country where they currently reside. If a family adjusts the knob to be closely connected to their hometown, for example, the Radio will transmit local radio streams, the Clock will set on a different time zone and glow in the colors of the sky back home, and the Calendar will print out the date with local newspaper headlines.

Through the materiality of *Geist*, families can manipulate their flows of material procuring and construct a sense of belonging and connectedness through repeated everyday performances.

tension between environmentalists and recreationists over the public use of the City of Boulder's natural heritage and to provide a means of social dialogue.

The idea was to encourage citizens to communicate using raw sounds rather than words. This was meant to help people connect in unexpected ways to one another's experiences, interpretations, and expectations about the mountains and parks in which they live and that they share. So we provided members of the community with a mobile application for capturing their sonic experiences and a mapping application for creating and sharing soundscapes of the places where sounds were recorded. Provocatively, we called the project Silence of the Lands.

This design successfully enabled people to learn from one another. One way this was achieved was by using colors to express whether a sonic experience had been positive, negative, or insignificant. People were creating a map together. The ability to weave together data about where and when a sound was recorded with the sound itself and people's sentiments about it gave the community a rich texture through which to express, communicate, and reflect upon their values in relation to those of others.

The design also provided ground for developing practices of walking and listening to the land, which fed back into the mapping. In other words, the design made perceptions and actions in the physical world commensurate with the set of values and practices that people were able to express in the online mapping.

DESIGNING FOR COMMENSURABILITY

com-men-su-rate today

- : equivalent, corresponding, compatible, proportionate
- : appropriate, fitting, adequate
- : in accord, coextensive

com-men-su-rate

in the connected everyday

- : proportionate, appropriate, consensual

And so, let me come back to this idea of commensurability.

Through digital interaction, we have become ubiquitous. We sustain multiple relationships with many people, and we continually grow our shadow of data—data about our connections, our

interactions, and our patterns of use. Connected to the Internet, everyday objects are about to follow the same fate. I refer to this new condition of existence as *the connected everyday*.

Living in the connected everyday complicates our relationships. It challenges our perceptions and our ability to interact in ways that are *commensurate* with the potential emerging from people and things connected across networks.

What I have learned from my earlier work is that taking on this challenge requires more than an understanding of how people socialize, establish relationships, and organize themselves in groups; it requires an understanding of how what we need to live in a connected world relates to our current practices in the physical world.

For designers, this commensurability is a matter of texture: enabling people to almost bodily feel, sense, and relate to data, connections, potential. It is also a matter of ground and arrangements: bringing online and offline practices in flow with each other and moving beyond their artificial dichotomy.

Potential needs texture, flows need ground, and connections need arrangements. Understanding how to design for commensurability in the connected everyday and how this knowledge can be applied requires substantial scientific research.

This research must be concerned with understanding *materials*, *practices*, and *constellations*. These pillars build on studies in the humanities and social sciences and in human-computer interaction, and on more traditional design research, all of which helps us to understand how objects are embedded in everyday life and how practices develop, change, and bundle around those objects to create an always-changing constellation of practices and values.

Let me briefly distill a few important insights.

1st Pillar: Materials. When we climb the stairways of an old village, the stones of those steps afford our climbing, and being large or narrow, rough or slippery, suggest a unique way of dwelling. The way in which the stone has gathered moss or been smoothed by use shapes and is shaped by our material interactions with the stairs we are climbing. Like others before us, we collaborate with the look and feel that

those stones develop over time.

In the same way, we embed stories and information in each and every crack and scratch, and in the wear and tear that materials manifest as we interact with objects and as they age. These traces remind us of moments in time, places where objects have matured or decayed, and connect these events to our own personal experiences *with* and *through* materials.

The first insight is that materials are not simply what objects are made of. They invite, suggest, facilitate, and collaborate with the unfolding of our activities and respond to these activities by aging, changing their appearance, and even leaking into each other.

2nd Pillar: Practice. The everyday objects we handle in a kitchen enable and constrain the practice of cooking. Though cooking as an activity is a recognizable practice, the way we cook is different in each situation: It is different if I am cooking in my lovely cluttered kitchen or if I am cooking at a friend's house in a tidy and spotless kitchen. In my cluttered kitchen, cooking is improvisational and creative. A variety of spoons and forks, different sizes of pots and pans, and scented jars and spices are scattered around to inspire always-changing recipes and culinary performances. Things have their place, but their place is different than in my friend's kitchen, and so are our ways of making food.

The second important insight is that objects have an intimate relationship with practice. They are not just tools, instruments to be used. They play an active role in how a practice develops,

COVER STORY

how it is performed, and eventually how it changes.

3rd Pillar: Constellations. Let's consider the practice of riding a bike. We bike to transport ourselves from point A to point B. But we also use our bikes for moving stuff to another house or for carrying children to school. Riding a bike is bundled to practices such as commuting, moving stuff, and carrying children in ways that are continually subject to change, as are practices themselves. How biking bundles to these practices depends on the construction of the bicycle and our perceptions of biking in different places and under different circumstances.

Practices do not exist in isolation. They emerge and develop through a configuration of elements, some of which (e.g., the same bike or the same value) may be part of other practices. These links are key to both the consolidation and the decline of practices.

The last important insight is that objects, practices, and values mutually influence and constitute each other in ways that are not fixed. I refer to this complex and dynamic web of elements as a *constellation*.

THE THREE DESIGN PRINCIPLES OF COMMENSURABILITY

But how do we mobilize these theoretical understandings? How do we apply them to the design of the next generation of digital technologies?

I propose three design principles: Create a rich texture of material experiences, ground flows in the practices of everyday life, and mobilize practices and values within arrangements that are open-ended.

I will explore and illustrate these principles through a series of design concepts and speculations. These explorations are the result of ideation processes mostly informed by either ethnographic research or research-

through-design methods. They attempt to investigate and mobilize materials, practices, and values as understood in the theoretical pillars of design for commensurability discussed earlier.

1st Principle: Create a rich texture of material experiences. When we look at the whittled counter of a coffee shop, we may notice how the varnish has flaked and chipped on the edge and how the wear and tear is more prominent right in front of the cash register. Like our stone stairways, such a counter has the ability to manifest the passing of time. Its appearance has accumulated experience from past activities, and—in a quite humble way—it tells us something about those activities. It gives us a sense of the social reality of the place.

Now consider how the surface of your smartphone communicates—notice its texture. If I look at my own iPhone, I can see little red bubbles float over my app icons. They remind me of how many emails or notifications I have not read or, assuming I have skimmed them without opening them, tell me how many of them I did not have the time to archive or to delete. This cognitive texture works quite differently from the subtle sense of social reality provided by the material fabric of the counter.

Creating a rich texture of material experiences means to bring data and networked connections closer to our bodily ways of knowing and doing. This requires broadening the repertoire of materials and forms used in interaction design.

2nd Principle: Ground flows in the practices of everyday life. Once again, let me use an example. I own a spoon that has been passed down to me by my grandmother. I still use it almost every day for cooking. The spoon has a unique materiality: what it is made of, the shape it has, the way it has worn out with use. This materiality shapes the cooking. At the same time, the spoon and that characteristic way of cooking remind me of my grandmother. Together, the spoon and the activity of cooking with that spoon create a material bond that connects me to my grandmother.

Now think of how checking in on Foursquare or Facebook has become a familiar way of saying “I’ve been there” or “I had great food!” Picture yourself in the act of taking a photo of the food you are about to eat and document that still moment. The material bond with the food is broken in the act, and the practice of remembering—though made shareable—is now linked to the immateriality of the cloud, together with the data associated to that experience.

The use of everyday objects and practices can make data, connections, and interactions relevant in ways proportionate and appropriate to the actions we perform in different physical environments and our broader social context. They can be used as both inspiration and ground to facilitate interactions that matter.

Grounding flows in the practices of everyday life means creating intimate relationships between the materiality of objects and how practices are performed around them. This requires bridging the artificial gap between online and offline practices, objects, and devices.

3rd Principle: Arrange practices in ways that are open-ended. I want to give you one last example. When I was a child, I used to go on vacation abroad with my parents. When visiting

DESIGN EXPLORATION #3

Thing Tank is an interdisciplinary research platform for designing a new generation of products and services capable of reinventing themselves [2]. *Thing Tank*'s hypothesis is that the misuse of everyday objects can provide insights into niche practices and niche practices can provide insights into emerging values, and that Internet of Things infrastructures can be used to support constellations of objects, practices, and values capable of adapting and changing.

In mainstream Internet of Things applications, things are often instrumented with sensors and software to make sure products perform optimally. A printer is a printer and a thermostat is a thermostat. In reality, once produced, things have secret lives. Rain boots want to be a doorstopper, cups want to be a prop, and forks like to occasionally become a garden utensil.

Thing Tank turns every situation of use into a potential design situation and enables things to finally enter into a consensual relationship with us—becoming what they want to be, connected in networks, serving recipes of their own choice and opening up design opportunities we could not otherwise imagine.

a new town, my dad liked to ask locals for information. Usually, it was to find the best restaurant in town. With a bit of Italian and a lot of gestures, my dad would ask the owner of the store, who would debate with a customer, who would ask another costumer, who would eventually give him his recommendation. Imagine a scene more or less like this one. My dad goes in with the excuse to buy something, takes the opportunity to chat, and eventually he pops his question.

Today we are blessed with all sorts of online services. TripAdvisor can tell my dad about the restaurants in town, how they have been ranked by customers, where they are located, and how much it is going to cost: certainly more effective. But the constellation of objects, practices, and values my dad activated was organized around each specific situation. And so it provided for an immediate tuning of questions and answers and for negotiation (the classic “cup of coffee in exchange for valued information”), and also easily allowed him to opt out from those connections and interactions, with no further notifications.

Arranging practices in ways that are open-ended means creating a constellation of objects, practices, and values capable of adapting and changing depending on the situation at hand. Links among practices are key to

such constellations.

This is my vision for the next generation of digital technologies, a generation of technologies textured in rich material interactions and experiences, not just screens. Technologies that support connections and interactions grounded and organized around practices in the physical world, not just layered on top of them. Finally, technologies that facilitate webs of different size and durability—and that do not need to be “always on.”

This is not nostalgic longing for a simpler, physically bounded life. In the connected everyday, practices mediated by digital technologies should be as rich as the best material practices; screens and smartphones should not be a default, but should be used only in their strength, next to other modalities; and the digital and the physical should not be considered and designed as separate worlds, but rather as intimately connected substrates of a more fluid reality.

In summary, we live in a world of increased complexity, in which digital data, everyday objects, and social practices are increasingly connected and interdependent. In a world of increasing complexity, designing digital technologies that facilitate

meaningful interactions and integrate elegantly in our everyday lives requires an understanding of how to design for commensurability—that is, making our ability to connect across networks commensurate with our current practices in the physical world. Designing the connected everyday is fundamentally about making things *commensurate* as much as it is about making them smart.

Initial explorations might be rough. But they have the spark and do set a direction. They are inspired by much of the interdisciplinary work carried on today in HCI (particularly materiality scholarship and practice-oriented approaches) as well as design research connecting earlier notions of meta-design to contemporary notions of infrastructuring. This is the work I hope to welcome in the forthcoming *Interactions* forum, Connected Everyday.

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ENDNOTES

1. Giaccardi, E., Robbins, H., D’Olivo, P., and Karana, E. Growing traces on objects of daily use: A product design perspective for HCI. *Proc. DIS 2014*. ACM Press, New York, 2014, 473–482.
2. Giaccardi, E., Speed, C., and Rubens, N. Things making things: Towards an ethnography of the impossible. *Research Network for Design Anthropology*. Seminar 1, April 10–11, 2014, Aarhus, Denmark.

Elisa Giaccardi is a professor at Delft University of Technology. She is the editor of *Heritage and Social Media*, in which she uses heritage as a lens to understand participatory values and practices. From meta-design to Internet-of-Things infrastructures, her research reflects a persistent concern with design as a shared process of cultivation and management of opportunity spaces.