
Using Autobiographical Design and Maker Methods In HCI Research

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Abstract

This position paper introduces an in-progress autobiographical design research project between the author and her family. Together they are designing and building bespoke Internet of Things systems to support ludic communication in their home. The project highlights potential juxtapositions between maker culture and autobiographical design research methods, and contributes to discussions of emerging research methods in Human-Computer Interaction.

Author Keywords

Autobiographical design; connected home; Internet of Things; ludic engagement; participatory design; research through design; DIY; Maker

Introduction

There is a growing discourse on the need for more first-person research and autobiographical design approaches in Human-Computer Interaction (HCI), that is, "design research drawing on extensive, genuine usage by those creating or building a system," [8,9] (see also [2]). In this paper, I discuss an in-progress exploration of design for ludic communication conducted with my family in our home. In this work, we act as designers, makers, and users simultaneously as

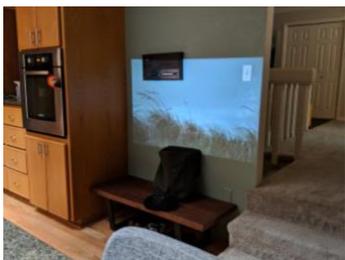


Figure 1: Projected video of a storm on the kitchen wall during the day.

we build Internet-of-Things (IoT) systems during my master's thesis in Design. Our skill levels occupy a spectrum from novice (children), amateur maker (my partner) and professional designer (myself). This project draws on existing studies in HCI both on ludic engagement and on family communication [3,4,5,7]. I focus on forming a link between the two research areas by exploring what I term *ludic communication* between family members.

HCI researchers (e.g. [1, 2, 4]) have fostered discourse on the varying roles of the researcher as designer, maker, and user in autobiographical design processes. Researchers also point to the blurring roles between producers and users of technology within maker culture [8,9]. I propose that integrating autobiographical design methods may be one way that a purposeful blurring of roles can continue to lead to valuable research insights. Utilizing Autobiographical design methods within a maker culture ethos [10] may point to new opportunities for the future of HCI research.

Ludic Communication

In my house, I observed ludic communication between family members in the form of writing and drawings on the wall of the house's one shower. The ludic communication there was non-urgent, asynchronous, and reflective of the writer/author's state of mind at that time. It was generally created in self-expression and sometimes for another person's discovery. It was often playful and humorous, or inquisitive, but sometimes even rude. In our case, it was impermanent—washing away over time with water.

After moving to a new house, we no longer shared a shower and I found that we did not communicate in the

same way in the new space. I wanted to explore how an IoT ecosystem might support ludic communication in the new house. To do so, I am conducting autobiographical design research—that is, research on myself and my family—by making functional research prototypes and living with them, while learning from our daily interactions over time.

Research Through Design and Making

We are currently in the process of iteratively designing, building, and living with three new IoT systems designed specifically for our home and family.

The first of three system designs began with the appropriation, or "hack," [6] of an owned object, a video projector. The projector was connected to an old cellphone and used to cast ambient videos on a wall in the kitchen—the most collective space in our house (Fig. 1). The videos are played with the sound off via a collaborative YouTube playlist. Family members can upload content either remotely via cellphone or computer, or directly at the projector site. We are in the process of building a set of four wireless projectors, each playing this one playlist. DIY tutorials available on the internet help us deconstruct and reassemble the instructions of other projects which are useful to the design of our new system. For instance, I consulted instructions on setting up a digital video kiosk in order to set the projectors to play the YouTube playlist on boot up.

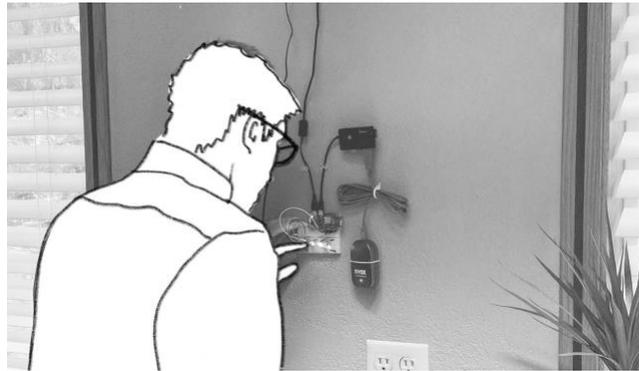


Figure 3: Author's son testing intercom functionality during the building process.

The second system's design is inspired by an existing and partially-functional home intercom system that was originally installed in the house in 1974. The idea was prompted by a discussion with my partner, who was speculating on using the intercoms to host a Google Home in multiple rooms in the house. The design includes four wirelessly connected intercoms which use a Voice over Internet Protocol (VoIP) host, and behave like walkie-talkies inside the house. Like the projectors, this system was also inspired and informed by an assemblage of DIY instructions. In particular, I reference a tutorial on building walkie-talkies, and another on creating my own private and secure server.

A third system involves a "ground-up" approach and is still under construction. In this design, we return to the shower as a place with particular significance to ludic engagement. We will connect our three showers wirelessly with a system of illuminated wall interfaces—which allows us to asynchronously communicate via tactile interactions from one shower to the others.

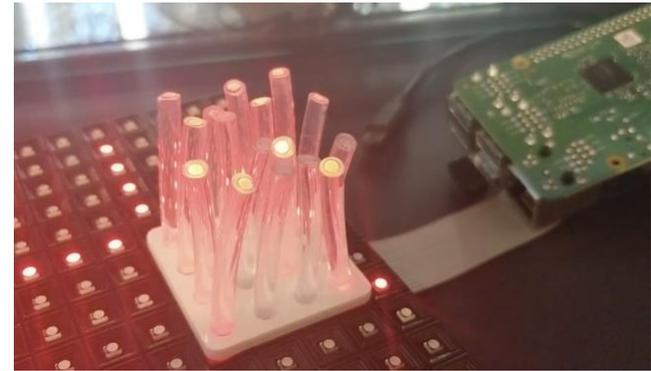


Figure 4: Tests of the visual effect of LED matrices with fiber optic tactile interfaces.

Autobiographical Designer as Maker

Though I am trained as an industrial designer and a skilled maker, when building computational objects, I am only a curious and determined novice. I use a variety of crowdsourced online media to help me build interactive prototypes.

When my code fails, as it usually does at first, or I struggle with a wiring schematic, I refer to online forums and search for the part numbers of the components I am using. When I need to understand components better, I look them up online. For example, when translating between capacitors, I use free online calculators. When through-hole soldering for the first time, I watched instructional videos on YouTube (Fig. 3). And, when I am feeling stuck, I visit my friends in maker spaces to reach out for help from experts, or I participate in Adafruit.com's "Ask an Engineer" (Fig. 4), a weekly live event online where makers and engineers meet to collaborate. It is through this open-knowledge transfer and the collaborative culture of makers, that I



Figure 2: Legacy hardwired intercom in the master bedroom.

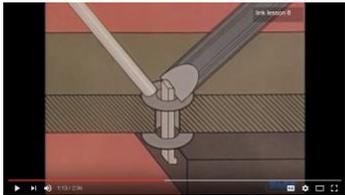


Figure 3: Basic Soldering for Electronics Lesson 7, "Integrated Circuits: The DIP-Type Package" produced by PACE, Inc. Viewed on Youtube.com

am empowered to make new computational objects. Despite being a novice programmer and without the aid of a multidisciplinary research team, I am able to explore new research questions in situ with functional prototypes.

Workshop Contribution

The progressive development of the projector from low-fidelity hacks to the higher-fidelity construction of ground-up IoT systems tailored to my family highlights two things I want to discuss in this workshop:

- 1) That maker culture's practice of knowledge sharing can empower designers, and non-designers alike, to explore alternate futures.
- 2) An exploration of emerging research methods which use autobiographical and participatory design methods, in collaboration with maker culture tactics, may present new opportunities in HCI research.

Empowerment Through Making

Involving family members in the process of designing and building our own systems has presented opportunities to experiment with flexing the roles of the designer and user. The participatory process enables intentional interruptions in power dynamics between parent and child, provoking rich conversation and bottom-up ideation on complex topics, such as privacy. It has also stimulated collaborative speculation on the future of computing in the home more broadly. When asked if he thought the project had changed our home, my son replied, "we have more intellectual conversations," for example around privacy and surveillance.

The motivation to include my family in the design of their own IoT systems was centered on two core values, first, that because they would be living with the new systems, they should be involved in their design and second, involving children and adolescents in the shaping of their environment is an effort to teach them not to dwell in the now, but in *what-could-be* and to be their own agents of change. This, I believe, nourishes empowerment, which can grow into other forms of creative activism and social dreaming.

Intentionally Blurring Roles

Autobiographical design methods use intentionally blurred and necessarily flexible boundaries between the role of the user, maker, and designer. This is of particular relevance with regard to maker culture, where we find a similarly blurry distinction between the designer and user [8,9]. The juxtaposition opens potential avenues to emergent methods and collaborations between autobiographical design, participatory design, and maker culture. There may yet be untapped methods of engagement with maker communities that this new lens can reveal.

This case study is but one demonstration of how maker culture has contributed to HCI research. There are also cases in which researchers have published their projects and contributed directly to DIY and maker practices reciprocally [1]. In this model, there may be potential for researchers to glean information from makers who are building their own adaptations of such objects and systems. We might ask, for instance, what did you change to the design and why?

I am interested to explore new ways to forge connections between autobiographical design and

maker culture as one, among many, potential paths forward for HCI researchers.

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