

Navigating Communal Use of Smart Home Devices: Empowering Households to Tend Their Digital Devices

Voice assistants, household helpers, toys and smart building technology, powered by electricity and data, are making their way into our households. New things brought to our homes for the purpose of ‘making life simpler’ inevitably challenge the way we do things.

Individuals perceive change differently. Some change might be rather obvious and mundane, such as where to store a new device in the home, whilst other change might be subtler and even go unnoticed. Researchers have highlighted how we – as individuals and households – have learned to deal with different kinds of change. This process is called *domestication of new technologies*: a spectrum ranging from shoe-horning them into our lifestyles, to completely changing the way we live our lives.

Complex social relationships and hierarchies influence the ways we deal with such situations of change. Individuals navigate these situations in inherently different ways, following the established communal order of the home, combined with personal knowledge, preferences, and attitudes. These situations can lead to social conflicts between cohabitants or with guests, relating to usage, but also to security or privacy issues.

Because cohabitants share a plethora of resources and responsibilities, not everyone will concern themselves with or be interested in using and maintaining devices in the same way. Researchers often refer

to aforementioned tensions as *power imbalances*. My research on empowering communal and digital privacy practices in smart homes aims to understand the mundane ways households deal with digital technology, and the challenges it causes specifically in ways related to issues of privacy and security. How can smart home devices be designed with complex social relationships and hierarchies in mind to balance needs of usability and privacy within the household and beyond?

Much of my work to date has been concerned with unpacking these situations. Power imbalances in households are nothing uncommon or particularly worrying; they are inevitable as responsibilities are distributed in the messiness of everyday life, and people trust their cohabitants (e.g. housemates, partners, parents) to be responsible. Many of you will be familiar with situations in which people help relatives or friends with the use of some internet-connected technology. Offering and providing help means to be accountable for one’s own advice, or vice-versa, the advice seekers will perceive a level of expertise in those they choose to ask. Other situations are similarly guided by social considerations and obligations.

On a more abstract level, we find that social expectations – which sometimes manifest themselves in social norms – guide the way we introduce new devices to a household, or we welcome guests to our homes.

Being a good and responsible cohabitant or homeowner then extends to considering implications of these expectations. When interviewing members of the general public about their use of internet-connected devices at home, we found a lens of group (or collective) efficacy can help structure the problem space and inform future work. The psychologist Bandura describes self-efficacy as a concept describing individual judgements of “how well one can execute courses of action required to deal with prospective situations”. Bandura explains how self-efficacy is influenced by one’s own experience (enactive attainment) and by observing others (vicarious experience) in success and failure. Collective efficacy can then be understood as the perceived ability of a group to deal with prospective situations. Members of that group will consider their own, each other’s, and the collective’s skills and competencies, when assessing prospective situations. Our research has shown examples of individuals specifically configuring devices for others, use of devices on behalf of others, and accommodating for preferences not to use particular devices by enabling alternative control options.

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We can leverage such insights to improve the experience of using future smart home products by designing for communal use. Informing design through a perspective of social expectations can help to unearth complexities of social relationships and hierarchies which might contradict the intentions and assumptions underpinning the design of technology. This perspective can

guide use of internet-connected devices in terms of access, use and responsibilities at home. Better understanding responsibility and action of the collective can help to empower individuals to serve as role models for their cohabitants. We can take structure and inspiration from self-efficacy by expanding the concept to the collective.

Martin Kraemer (2016) is currently working on his DPhil in Cyber Security. He is currently finishing a six month ethnographic study of communal use of smart home devices. The study further explores households' mundane ways of navigating complex and unfamiliar situations to inform the design of future smart home products. He is based at the Department of Computer Science where his research falls within the wider theme of Human-Centred-Computing.