

RESEARCH FROM THE HUMAN EXPERIENCE & DESIGN GROUP THAT MIGHT BE USEFUL IF YOU WORK ON PRODUCTS **FOR THE HOME.**

05
ISSUE

THINGS WE'VE LEARNT ABOUT



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Examining the routines and rhythms of home life provides opportunities for rethinking the roles technology has in bringing us together and in intensifying our collective experiences.

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We show in this section that connecting families via communication technologies demands a sensitivity to the diverse, context-dependent ways we want to be together or be apart.

38 ORGANIZATION

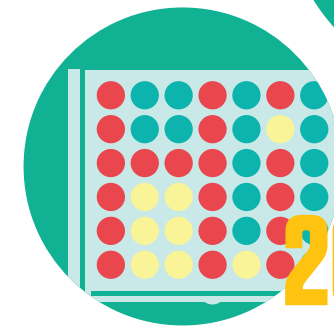
The urge to 'solve' household organization is questioned in this section, with an emphasis placed on how the continual efforts to bring order to a home are tightly bound up with the values households work hard to uphold.

50 PLAY

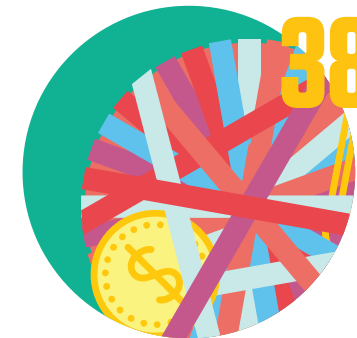
Play in this section is shown to be a pervasive endeavour in home life, one that is used, sensitively, to share, bond and on occasion mock. We look at how we might atune designs to be open to these playful interactions.

60 THE FUTURE OF INTERACTION IN THE HOME

This is a more speculative section, asking deeper questions about the emerging role for sophisticated machine learning and computer vision systems in our homes.



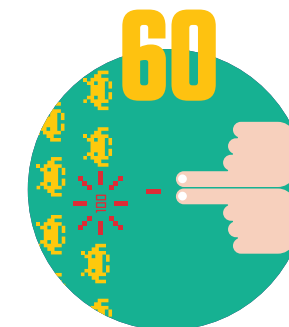
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CHAPTER 1 | HOME MAKING

WE ARE FOREVER CRAFTING OUR HOMES, FOREVER MAKING THEM FEEL OUR OWN IN WAYS THAT INSTILL OUR VALUES AND HOPES. COMPUTERS, TABLETS, CELL PHONES, GAME CONSOLES, AND OTHER DIGITAL DEVICES ARE INCREASINGLY PLAYING A ROLE IN THE WAY WE DO THIS. HOW SHOULD WE MAKE SENSE OF TECHNOLOGY IN OUR HOMES AND HOW MIGHT WE APPROACH DESIGNING NEW EXPERIENCES FOR HOME LIFE?



Making technology at

HOME



HOMES ARE FAR MORE THAN BRICKS AND MORTAR, OR A LITANY OF FUNCTIONAL ACTIVITIES LIKE EATING, SHOPPING, PLANNING, ENTERTAINING AND CHILD REARING. WE ACTIVELY AND CAREFULLY MAKE OUR HOMES INTO THE PLACES THEY ARE, BRINGING TOGETHER A MIXTURE OF PRACTICES AND THINGS TO EMBODY PARTICULAR VALUES AND EXPRESS HOW WE WANT TO LIVE.

For more than three decades, the technology industry has been imagining and working on information communication technologies for the home. A persistent idea has been that of the “smart home”, a home that can sense things about its inhabitants and respond accordingly. Examples present visions of voice-controlled home-computers conversing with household members, and helping with the homework, cooking and the management of busy schedules.

Over time, this vision has evolved to exploit more recent innovations. The proposals now include the seamless distribution of computing power throughout the home. The miniaturization of computers and the availability of sophisticated networking and machine learning technologies mean that the envisions go beyond clever ways of interacting, directly, with computers. By embedding the technology in the environment, the smart home has been extended to include an ambient sensing of what inhabitants are doing, how they are feeling and what to do about it; everything ranging from one’s movements to one’s physiological measurements can be monitored, analyzed and responded to.

So, in the smart home, fridges are able to order stocks that are running low, inhabitants’ routines are tracked to optimize energy consumption, and the health statistics of household members are monitored and, if

necessary, shared with care-givers. These innovations are not just limited to the sphere of household chores and routines. Forms of entertainment and leisure are set to be transformed. Media will be browsed on wall displays and tabletops, and maybe even through holographic projections. In more sophisticated homes, environmental conditions will be adjusted to suit people’s moods, and entertainment centers will learn people’s tastes. Communication too will be enhanced; there will be new ways of speaking, seeing and sensing one another.

THE “SMART HOME” IS A FICTION, A FICTION THAT HELPS US IMAGINE NEW TECHNOLOGIES AND NEW WAYS WE MIGHT USE THEM. HOW CAN WE BALANCE THIS FICTION WITH HOW PEOPLE REALLY LIVE IN THEIR HOMES, HOW THEY ARRANGE AND MANAGE ORDINARY DAILY LIFE TO SIMPLY GET ON AND BE WITH ONE ANOTHER?

WHAT REAL HOMES ARE LIKE

While these kinds of technology-led visions of the home are useful—giving us a sense of what is possible—they mask how we actually live in our homes with technology,

and crucially why we do. By making our homes seem like highly systemized and functional places, with predictable behaviors from inhabitants, they hide so many of the things that make our homes feel special and the care we put into making them feel that way. This is not to say that people eschew technology. The complexity here, though, is that technology gets taken up in a piecemeal fashion and takes shape, often in unforeseen ways, in a web of practices and values. Thus, in practice, our relationships with the environments we inhabit seem more nuanced, more messy, more human somehow.

Think about the preparation and consumption of food in the home as an example. If it was simply a matter of ordering stocks that were running low, finding recipes that matched the ingredients on hand, and cooking them in the right order, then automation would seem the straightforward solution. The trouble is that mealtimes at home involve much more than this. Provisioning for the home, carers have to balance their family’s likes and dislikes with what is considered ‘good’ for them. Routine food preparation is often done at fraught times when households are readying themselves for work or school, or returning home tired and all too often ill-tempered.

Parents also try to instill certain values in their children surrounding food. Children can be taught the basics of cooking during food preparation even though the experience is

usually far from optimal. Values concerning diet, health and well-being are conveyed, too, in what should be eaten and when. At other times meals are about celebration and creativity where food preparation is not seen so much as a set of tasks, but as a way of being together and experimenting with new ways of making meals. In these contexts, how should we see systems that seek to replace and routinize these kinds of activities and choices?

The ever-growing presence of computing in our homes in the shape of laptops, tablets, cell phones and even ‘intelligent’ sensing systems, like Kinect and Cortana, extend this line of questioning. We’re seeing technologies weaving into the social fabric of home not just as functional ‘solutions’, but truly shaping how we interact

with one another. It’s not uncommon now to find households using tablets and phones to consume content, and owning ‘time-shifting’ solutions to access media so that they can consume that content when it suits them. It’s hard to say, for now, whether the increased time accessing content in these ways is reducing the time we spend together. What is changing is what we do together and the kinds of relations we form through our communal activities. Homes are being made and remade through the continual interweaving of computing and social life.

FINDING OUT WHAT MATTERS TO US IN THE HOME

The challenge here is understanding what matters to people in their homes: what values they want to preserve and how open they are to the new arrangements, routines, and rhythms that might come along with technology.

THINGS LIKE ENTERTAINMENT CONSOLES, CELL PHONES, AND TABLETS ARE TRANSFORMING OUR HOMES. WE NEED TO UNDERSTAND THE WAYS TECHNOLOGIES WEAVE INTO HOME LIFE, HAVING A TRANSFORMATIVE EFFECT ON HOW WE LIVE BUT, AT THE SAME TIME, THREADING INTO THOSE ESTABLISHED IDEAS AND VALUES WE HOLD DEAR.

Marking the inauguration of our new group name, the Human Experience & Design Group, we want here to reflect on the ten years we have been conducting research into home life. We want to draw out the lessons we’ve learnt from doing fieldwork in people’s homes and, also, what we’ve learnt from building experimental prototypes that support the ways people use technology in their homes.

In what follows, our overriding message will be that our homes are places we invest in deeply—that we take great care and put real emotional work into nurturing our homes. You might say that we weave a moral fabric into the places we live, making our homes feel special by stitching together technological things with the ideas we have of what matters for those we love and care for. The home, in this way, is something always being worked on and crafted, always in the process of becoming what we value and hope for. In designing for the home, then, we want to show it’s important to understand not just how bricks and mortar houses are actively made into homes, but how technologies play a part in helping us do this—in making the places we live in feel like home.

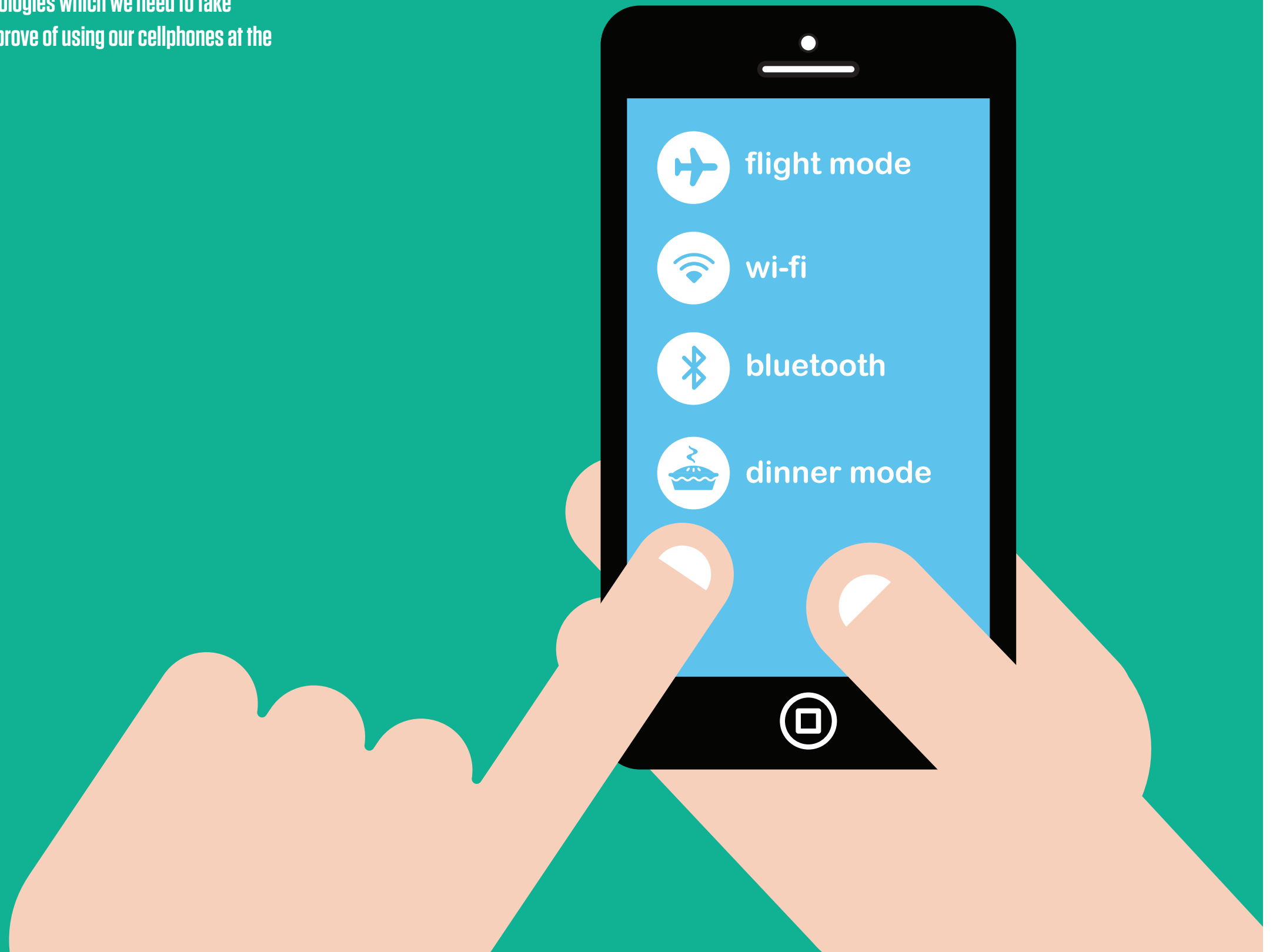
TIME AT HOME

Seeing home life as a set of tasks can lead to over-automation: designing home technologies is as much about recognizing how we want to spend our time as it is about how we save time and “get things done”.



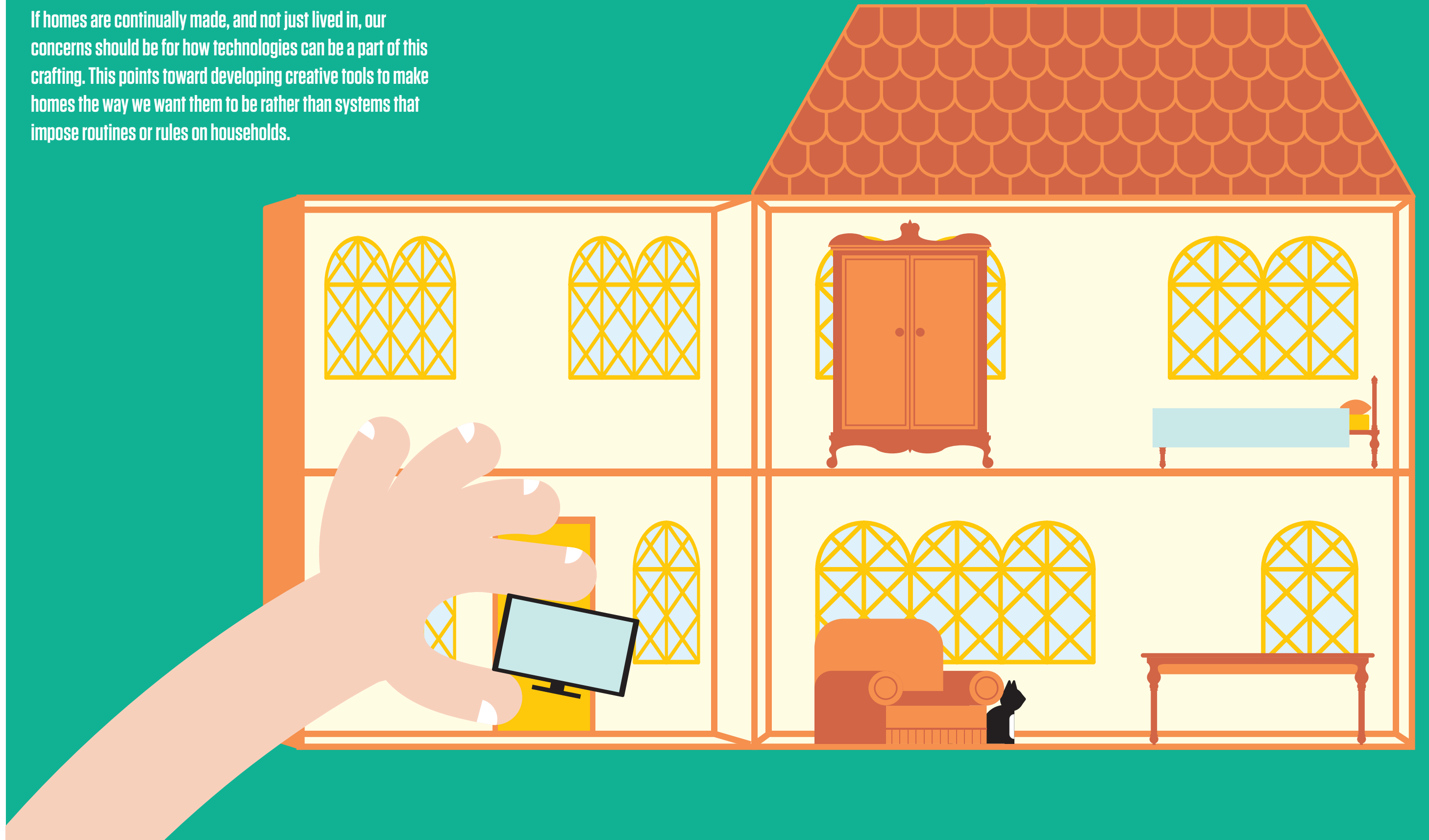
THE MORAL ORDER OF HOME

In designing home technologies there is a “moral order” we need to be aware of. In other words, there is a “right” time and place in the home for certain technologies which we need to take account of when we design them. For example, if we don’t approve of using our cellphones at the dinner table, what kind of technology, if any, might be better?



CRAFTING IDEAS OF HOME

If homes are continually made, and not just lived in, our concerns should be for how technologies can be a part of this crafting. This points toward developing creative tools to make homes the way we want them to be rather than systems that impose routines or rules on households.



A CARE FOR WHAT MATTERS

Together in the home doesn't just mean being together. It can also mean how people care for one another in their homes, how they tend to each others' needs, and share things that matter. Technology can be used in support of all of these activities.



CHAPTER 2 | RHYTHMS

ONE OF THE WAYS WE MAKE OUR HOMES SPECIAL IS THROUGH THE ROUTINES AND RHYTHMS WE ADOPT. THESE RHYTHMS ARE HELPFUL IN COORDINATING INDIVIDUAL TASKS AND ACTIVITIES, BUT THEY ALSO AFFECT HOW, WHY AND WHERE WE COME TOGETHER. TECHNOLOGY INTERLEAVES WITH THESE HOUSEHOLD RHYTHMS, HELPING TO SUSTAIN THEM, YET AT THE SAME TIME AFFORDING NEW SOCIAL ARRANGEMENTS.



TIME OUT

In the devices and services we build, how might we accommodate the multiple and sometimes opposing rhythms we find in households? How might an interface support simple sharing and collaboration, but, just as easily, allow people to carve out moments for themselves?

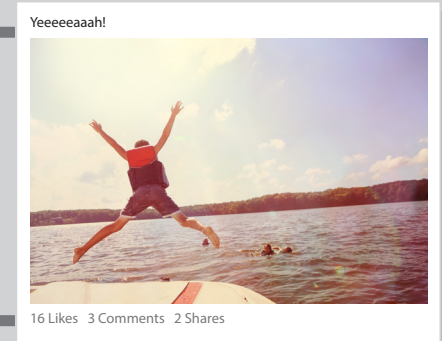
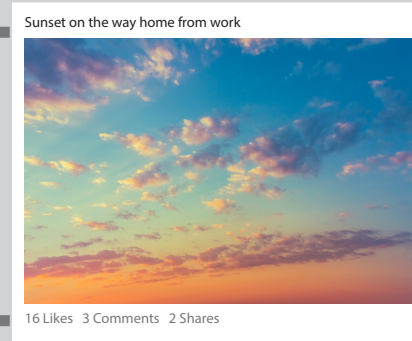
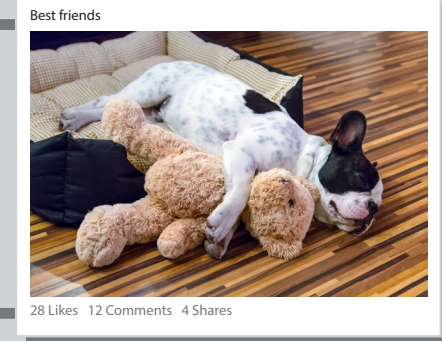
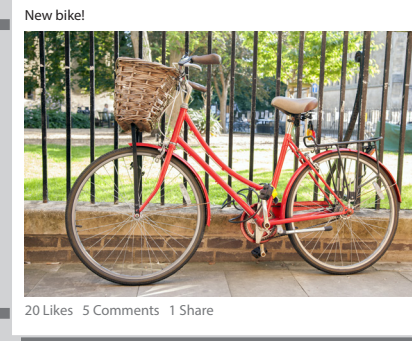


TECHNOLOGIES OF ENCOUNTER

How can we design technologies that intensify our encounters in those times and places we are together?



A ticket to TALK



Drawing on the idea of the mealtime being used as a routine way to bring family rhythms together in moments of shared quality time, we developed 4Photos as a means of enhancing that experience. The concept recognizes mealtime as an important opportunity for sharing everyday narratives of personal and collective significance – a means through which people can understand and respond to the everyday happenings of other family members and a means through which the social order of the family can be played out.

4Photos was designed as a table centerpiece that sits unobtrusively among the various mealtime paraphernalia. Photos from the Facebook accounts of those at the table are collected together and then presented as a photo stream across the displays of the system. IR sensors are embedded above each of the four displays enabling anyone to “push” the most prominent photo on their display to all of the screens by moving their hand toward the device. Spinning the rotating head of the device also generates a new set of photos by selecting a set randomly from the album of the person it points toward.



The system is designed specifically to open up participation and interaction by all those around the table. It is visible and controllable from wherever they are seated, and having content that is owned and curated by everybody present. In this way the system offers a range of ways in which the gathered family members can contribute to the ongoing reflection and narrative exchange that takes place around the presented media.

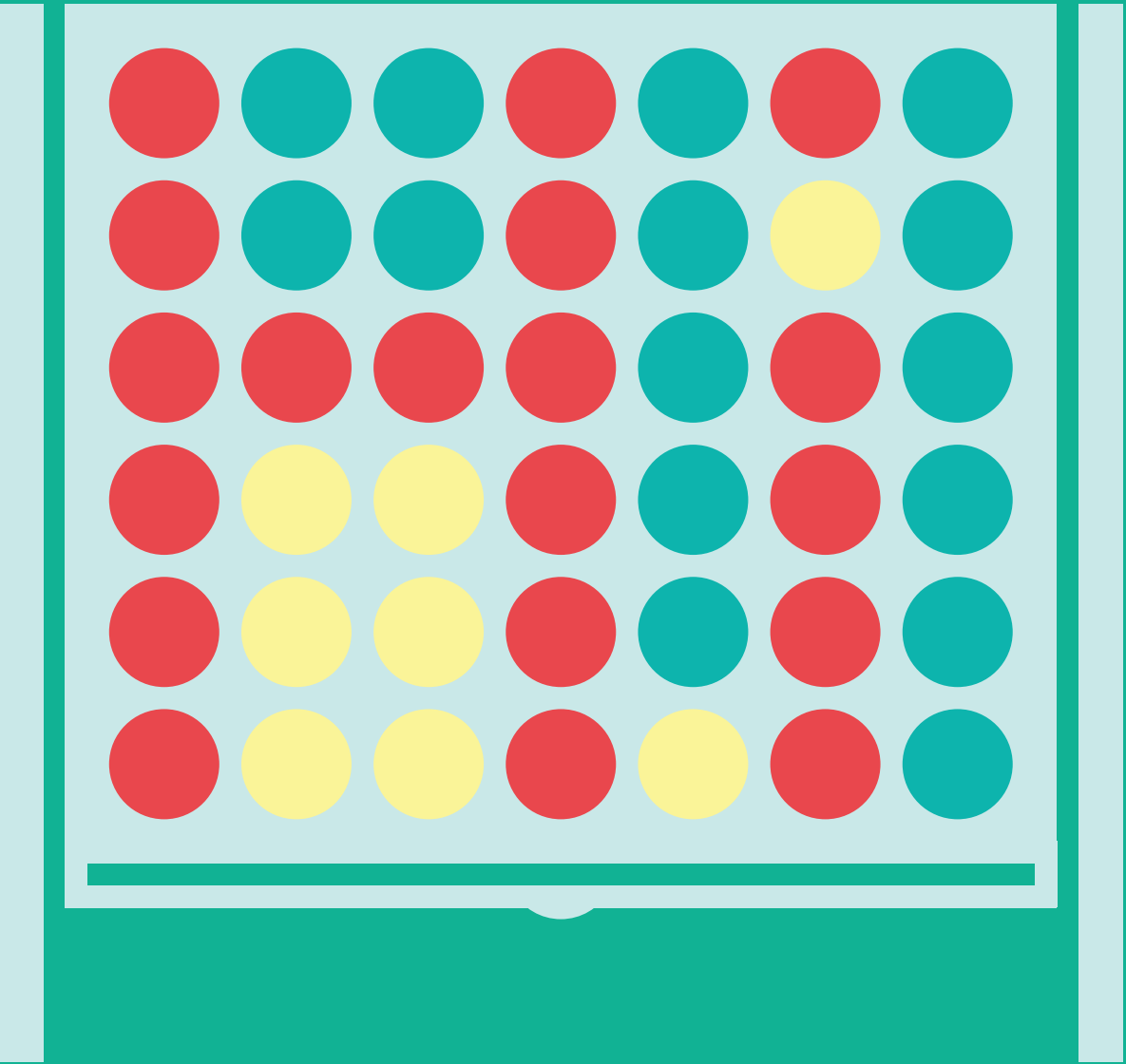
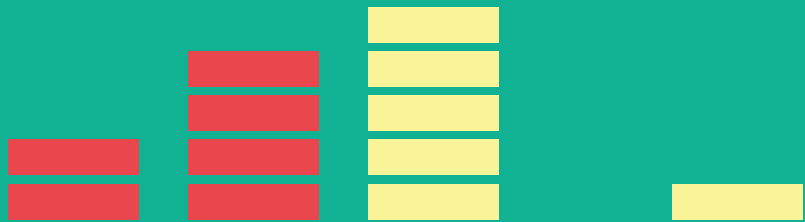
When we deployed this system at family meal times, we found that not only did the device spark conversation and create the opportunity for stories, but it highlighted the way family meals are about managing the flow of conversation, and the pragmatics of serving and eating a meal. In addition, it created opportunities for guests to learn about each other, and families to reminisce, to teach children about appropriate behavior, and to take on different roles in the conversation.

Right: Mealtime with 4Photos.
Opposite page: 4Photos prototype.



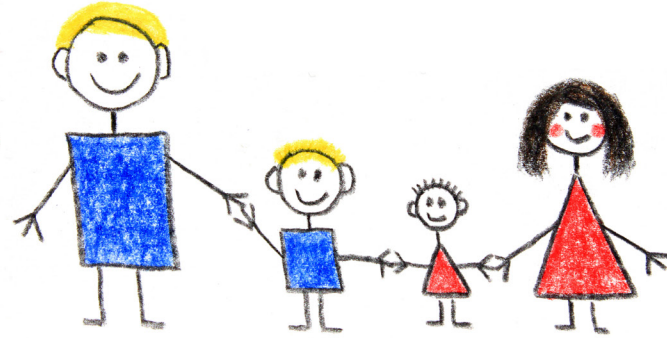
CHAPTER 3 | CONNECTIONS

NEW COMMUNICATION TECHNOLOGIES RAISE IMPORTANT QUESTIONS FOR HOME LIFE. WILL THEY HELP STRENGTHEN THE BONDS THAT ALREADY EXIST, OR WILL THEY COMPLICATE OR ACCENTUATE TENSIONS? WILL THEY ALLOW US TO CONNECT MORE WIDELY WITH THOSE WE CARE ABOUT, OR WILL A PRE-OCCUPATION WITH FAR-FLUNG CONNECTIONS SIMPLY MEAN LESS TIME FOR THOSE WHO ARE HERE NOW, AND CLOSEST TO US?



Connecting with

Family



FAMILIES, WHETHER TOGETHER OR APART, USE A DIVERSE ARRAY OF TECHNOLOGIES TO STAY IN TOUCH. THE AFFORDANCES AND FEATURES OF EACH TECHNOLOGY, WHETHER IT BE TWO-WAY VIDEO OR A MERE POST-IT™, ARE UTILIZED WITH VERY PARTICULAR KINDS OF CONNECTIONS IN MIND; SOMETIMES WE MAY JUST WANT TO EXCHANGE A SHORT MESSAGE, BUT AT OTHERS THE INTENTION MAY BE TO SUSTAIN A MORE PERSISTENT SENSE OF INTIMACY AND TOGETHERNESS. THE 'GENRES' OF COMMUNICATION AFFORDED BY DIFFERENT TECHNOLOGIES ARE THEN VALUABLE TO US—THEY ALLOW US TO CONNECT AND BE EXPRESSIVE IN THE MANY WAYS THAT MATTER.

In working life, we often characterise communication as a way of coordinating teamwork and getting tasks done. For teams who are geographically dispersed, new technologies such as Skype are regularly seen as an alternative to travel, and an attempt to replicate some of the qualities of meeting face-to-face. When it comes to home communication technologies, we can fall into the trap of seeing them simply as functional tools for coordinating family life, or bringing remote family members together. When we look more closely at how we connect with family, whether we live together or apart, we see that it is about much more than this. It is not simply about the communication of information, or trying to share a virtual space. From the most intimate relationships between couples and the dynamics of the immediate family, to extended and even fractionated families, connections are an ordinary part of daily life; they revolve around not just special events but common household chores, and simple laughter and play. It can be about negotiating being together, or even being apart.

In these endeavors, technology has historically played a central role, and, in turn, technological development has been spurred on by the needs of family connection. In fact, many technologies have found their way into the home from the office. The internet, email, text messaging, and video communication tools all started out as work-based tools, but all have now found themselves truly at home in family life. Here we see that families and loved ones develop a rich panoply of communicative forms. Weaving together the affordances of different devices and services, from text messages on mobile phones to Facebook and Skype, those who live together (and apart) piece together their own genres of communication. They develop subtle senses of what the different communication channels are good for and how best to interleave them into the textures of home life.

LIVING TOGETHER

When we examine people's homes, one of the things we find is that, in addition to all of the "high tech" systems that households use to communicate with one another

like phone calls, texting and email, they also use a wide variety of mundane communicational artifacts such as paper notes, paper mail, sticky notes and whiteboards. Our work has found that these very ordinary artefacts are highly revealing about the nature of communication within households.

One aspect of these is that they are carefully placed in the home. For instance, a note placed on the refrigerator door has implications for how it will be used and who will see it. In the home, people make decisions about where best to leave a message for others through an understanding of the normal ebb and flow of the household. This can result in there being places that can be thought of as "coordination centers" where many important messages get left.

These kind of "place-based" messages, such as those inscribed on paper notes or on kitchen whiteboards, have an important "at-a-glance" property. That is, they take on a visual persistence when casually left in places around the home. These affordances mean that they are subtly but effectively 'pushed' to people's attention in the home in a peripheral way. Another aspect of this is that often these messages are not placed for anyone in particular but for anyone and everyone present in a room or area of the house. In a sense, they serve to "broadcast" to the whole household. This is unlike the person-to-person character of text messaging and phone calls, or the wider audience of social networking sites.

What kinds of messages are these? Through examining them in detail, we see they serve a range of purposes. Sometimes these

messages are very functional in nature: they may issue instructions and commands such as 'please do this' or 'do that', they may be reminders about appointments or events, be messages that are passed on from one person to another, or be a way to store important information such as lists, phone numbers, names and dates.

But others are much more about expressing affection and confirming the fact of "I'm thinking of you". This can range from posting "Happy Birthday" or "Good luck on your exams", to simply wishing the family good morning.

These are, in a way, a closer-to-home version of the postcards we get from family and friends in far-flung places. Other kinds of messages too might appear to be largely about reassuring the family of one's whereabouts, such as teens and older children letting their parents know where they are. Again, though these might seem largely functional in nature, they are as much to do with thoughtfulness as they are with practical affairs.

LIVING APART

What about the nature of communication when families live apart? It is only in the last 5 years that researchers have begun to look at how tools such as video technology support home communication in these situations.

In our own work on the use of video links for families separated by a distance, we were particularly interested in why families would choose a video link over other means of communication. The answer was that video made them feel "closer" to each other than a



Above: Household messaging.

phone call or email. But it turned out that “closeness” really had many meanings. And this very much depended on the relationship between the parties involved. We found that for a lone family member separated by distance, closeness can mean feeling involved in life back home. This can mean peering into the family home to get a sense of who is around, to speak to many people at once, and to get a sense of ongoing activities back in a familiar place. Having a view into these activities can also mean actually partaking of a routine. Being an onlooker while the family meal is cooked, reading a bedtime story to a child, or even watching part of a sports event on TV are all the kinds of things that make someone feel closer to family.

For even more intimate relationships, such as between couples, open links between places sometimes are left on continuously to give a sense of shared life and space. Such links do not require continuous conversation. The fact that there is often no need for talk is, in a way, a symbol of the closeness of their relationship.

When it comes to other kinds of relationships, such as those between parents and grown-up children, or grandchildren and grandparents, closeness means something different. For example, closeness can be about fostering links between grandchildren and grandparents. Key here is that many parents want their children both to recognize and be recognized by their grandparents. When it comes to very young children, video can also provide a kind of visual interaction not possible over the telephone. After all, very young children need time not only to acquire the basics of language but also the rules of turn-taking and other social skills necessary for phone conversations.

Finally, for couples who have moved away from home and established their own homes, video calling can be seen as a kind of duty. Some couples articulated that it may be more important that they allow themselves to be seen by their parents, than vice versa. Though such calls are sometimes carefully framed, offering up a video call shows willingness to focus on the call, to dedicate time, and to agree to see and be seen.

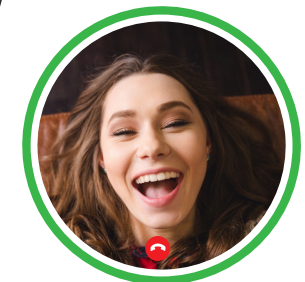
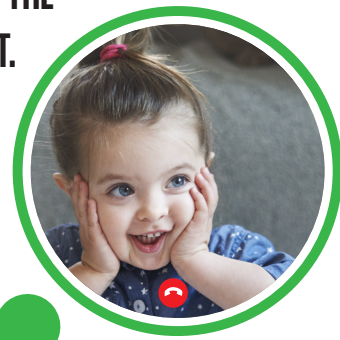
THE RELATIONSHIP BETWEEN FAMILY MEMBERS WHO ARE REMOTE HAS A SUBSTANTIAL IMPACT ON THE REASONS WHY COMMUNICATION TECHNOLOGIES SUCH AS SKYPE ARE USED AND WHAT FEATURES OF THE SYSTEM MIGHT BE IMPORTANT.

CONNECTING WITH HOME

These examples show that, when it comes to messaging, something special is going on in home settings. There is what one might call a delicate knitting of moral and practical concerns.

Home communication is often grounded in a mutual understanding of the daily concerns of households such as their everyday activities, routines and movements. In turn, all of this is tied to every home’s idea of appropriateness, thoughtfulness and affection and how that changes according to our relationships with one another. In short, home communication reflects the moral order of the home: what is right and wrong in the home, what matters and what does not.

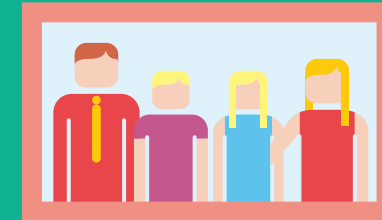
Image: A rich mixture of communicative forms evolve among families



CONNECTIONS IN PLACE

Communication “in place” is a feature of family life. How can we develop new communication tools that have these qualities, such as visual persistence and a place in the landscape of the home?

In-home communication is as much about affection, reassurance and the celebration of family life as it is about practical affairs. How can we support these more playful and tender aspects of home communication?



TOGETHER APART

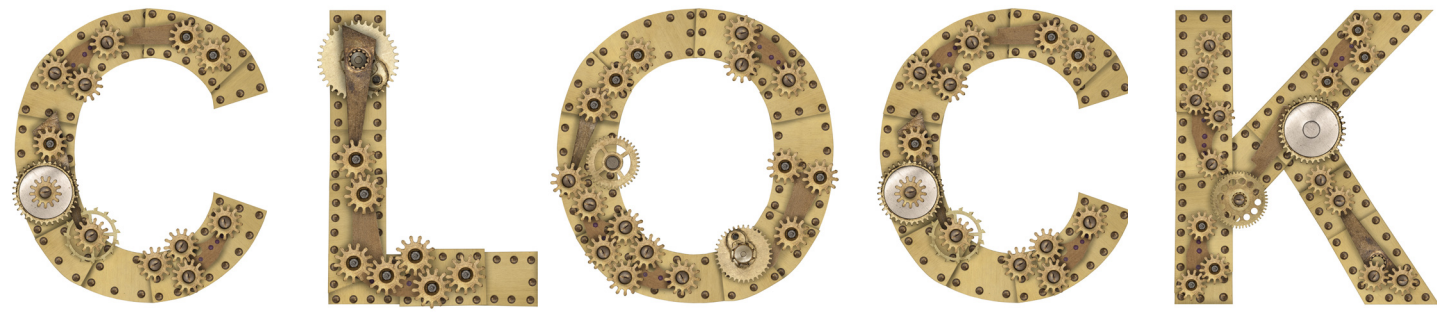
For lone family members away from home, the ability for them to “move” around the home remotely may be important. Conversely, for couples who have established their own homes, the ability to frame and control the call, including the camera view and timing of calls, is key.

Couples separated by a distance may often use open and continuous links as a way of sharing their lives. Here the ability to see one another’s activities may be more important than the need to have focused conversations.



CASE STUDY

The Whereabouts



What would it look like to design a device that focuses on the idea of broadcasting information and at the same time exploits the highly situated knowledge people have of those they live with? How might households respond to a technology playing a role in personal activities and sharing (if only within the household) sensitive information about a home?

The Whereabouts Clock was a prototype we designed to explore this line of thinking. Built as a situated, family awareness device designed to be located in a place in the home (like the kitchen) where it becomes a part of the routine of family life. The aim of the Clock was to let families see information about family members' whereabouts "at a glance" through an always-on device modelled on the idea of a mantelpiece clock. Because of its ambient nature, the goal was to continuously "broadcast" information to anyone in sight of the device. This meant that only family, and anyone allowed into the kitchen by the family, could see the device. Because it was deliberately designed for the whole family to view, it was also distinct from other kinds of person-to-person communication technologies such as phone calls, texting or email.

Family members' current location was displayed as one of four privacy-preserving, deliberately coarse-grained categories. Each member of the family had their own icon, which drifted between zones labelled either "home", "work", "school", or "elsewhere" (as indicated by a family member's icon moving to the middle of the Clock). Each zone was determined by the family member themselves using an app on their mobile phones, which allowed them to label certain locations. Once labelled, the app used

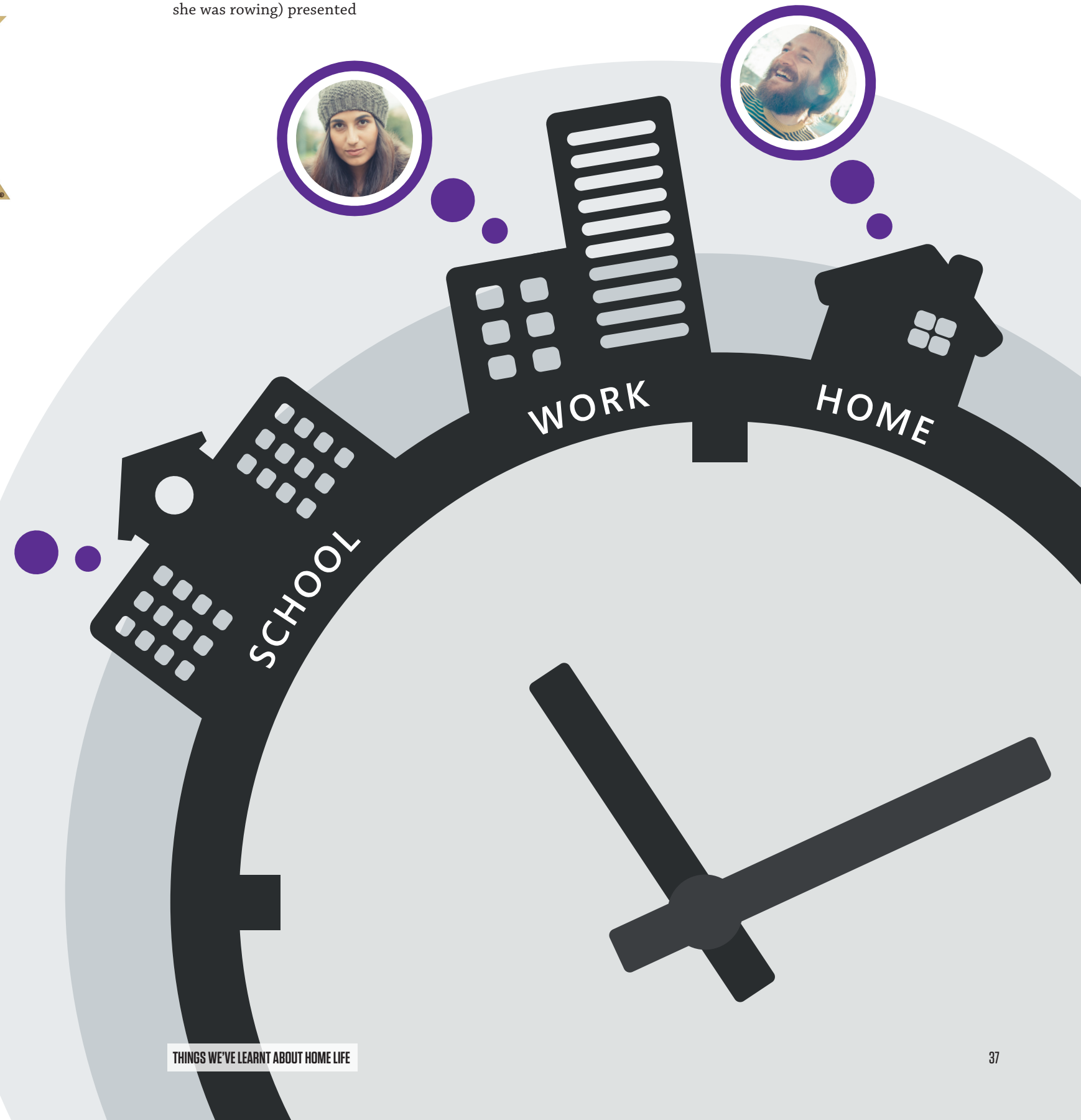
cell tower strength to locate them, and no further user interaction was required. Family members also had the ability to send text messages to the Clock which would circle around the outside of their icons to call attention to a message.

In a field deployment, we found that families used the Clock in many different ways. The text messaging function was used mainly for awareness and communication, such as alerting the family to traffic jams, imminent arrivals and so on. But in the main, the clock was used for reassurance, connectedness, togetherness. Another frequent use of the Clock was 'social touch', it was a channel through which family members could express care for one another. Glancing at the Clock gave families the sense that all was well with the world and that their members were where they were meant to be. The movement of icons from one zone to another also helped families feel more strongly connected to one another when outside the home. For example, one mother liked to see how her son's icon moved from "School" into "Work" whenever he went to sing in the choir at chapel (her son had labelled the chapel as "Work"). Another frequent use of the Clock was for social touch, showing care and affection for one another. One family would regularly have tea or meals ready when they saw that a parent was starting out from work and on their way home.

Key here was that families learned to "read" the Clock well because they understood each other's routines. The fact that the labels of "home", "work" and "school" were both deliberately coarse-grained, and could be applied to anything (one woman labelled her garden as "work"; another the river as "school" to mean she was rowing) presented

no problems for people who knew each other so well. In addition, families overwhelmingly saw no problems with privacy because of this—they reasoned that knowing about each other is part and parcel of family life.

Image: Reflecting the rhythms and routines of home life.



CHAPTER 4 | ORGANIZATION

DISORDER AND MESS ARE PERSISTENT CHALLENGES WE FACE IN OUR HOMES, CHALLENGES THAT WE'D LIKE TO IMAGINE WE MIGHT ONE DAY 'SOLVE'. THE PROBLEM IS BRINGING ORDER TO THE HOME ISN'T JUST ABOUT SORTING STUFF OUT, IT IS ABOUT ORGANIZING MEANINGFUL AND EVER CHANGING RELATIONSHIPS. HOUSEHOLD ORGANIZATION IS THUS ABOUT MAKING THINGS FEEL 'RIGHT', ABOUT SORTING THINGS OUT AND AT THE SAME TIME BRINGING AN ORDER TO WHAT AND WHO WE CARE FOR IN OUR HOMES.



Managing home life

THERE IS A TIGHT COUPLING BETWEEN THE MUNDANE ORGANIZATION OF HOUSEHOLD STUFF AND THE WAYS WE SUSTAIN AND DEVELOP OUR RELATIONSHIPS AT HOME. BY SORTING THINGS OUT INTO WHAT IS FUNCTIONAL, WHAT MAY BE SENTIMENTAL, WHAT IS UNWANTED, AND WHAT FALLS SOMEWHERE IN BETWEEN, WE ARE MAKING DECISIONS ABOUT HOW THINGS ARE VALUED IN OUR HOMES, WHEN AND WHERE WE CAN ACCESS THEM, AND WHO HAS RIGHTS TO THIS ACCESS. IN ORGANIZING THINGS, WE ARE, IN EFFECT, ORDERING OUR HOMES AS SOCIAL PLACES. THE TOOLS WE USE TO ORGANIZE THINGS ARE, THEN, CRITICAL TO HOW WE LIVE TOGETHER, AND HOW WE WISH TO.

It's tempting to think of household organization as something to be solved, once and for all. The household or family calendar is something that is repeatedly subject to this mindset. We want to believe we can design the perfect calendar that will meet all the different needs of those who live together—an 'Outlook for the home'. The thing is, so much is invested in what is added to (and left out of) household calendars. Writing something into a family calendar is so much more than a functional decision, it speaks to what (and who) is prioritized in a home, what kinds of activities take precedence, and who has rights and privileges to decide for everyone. What we see here is a moral character to home life and in this case the organization of home.

Our research has aimed to broaden the scope of household organization in an attempt to get at the real motives and concerns, and not get fixated on designing the perfect calendar. We've looked, for example, at how people try to bring some kind of order to the home using paper-based calendars and lists, displaying things on fridge doors and even putting things in piles and junk drawers.

VISIBILITY AND ACCESSIBILITY

As we've seen in the previous chapter, households use the visibility of their organizational materials to display their status and role. Calendars and household lists are more often than not put in kitchens where everyone has easy and immediate access to them. The very nature of the kitchen (and who has 'rights' to it) means that the content is accessible—the visibility of the calendar defines its status in the home. Contrast this with organizational

software on a PC or online where the calendar needs to be 'switched on', is just one of the many applications vying for attention, and can be locked behind usernames and passwords.

People use, to good effect, visibility and accessibility to manage and organize things. Technology, conversely, treats both these qualities in very crude ways; both can be on or off and these states don't usually convey anything about how a house should interpret the status of the 'tool'.

WE CONTINUALLY WORK WITH THE QUALITIES OF VISIBILITY AND ACCESSIBILITY TO ORGANIZE OUR HOMES. BY EXPLOITING THE MATERIAL QUALITIES OF THINGS LIKE WALL-HUNG CALENDARS AND HANDWRITTEN TO-DO LISTS, WE'RE NOT JUST BEING ORGANIZED, WE'RE WORKING ON WAYS TO EXPRESS THE SOCIAL VALUES THAT ARE IMPORTANT TO US.

ARTFUL SYSTEMS

It's not just the material and visual qualities of our organizational 'tools' that matter though. It's also important for us to experiment with different processes of systems over time. With ever changing social arrangements (e.g. new activities being taken up, people getting older and moving in and out, new relationships, etc.), the home is a dynamic place and, unsurprisingly, people create and adapt



Above: The artful systems designed to order home.

their organizational systems alongside the changes. We think of these as the 'artful systems' crafted by households because, in their design, a real sensitivity is shown towards how homes operate and the relations between people. We've found, for instance, households that artfully create systems, consciously giving children increasing autonomy and control over decision making; a household shopping list is left on the kitchen table for all family members to contribute to or a colorful whiteboard, labeled with days of the week, is hung in the children's room to invite them to add daily reminders.

Whatever the 'system', the point here is that people like to try things out, sensitively responding to and shaping the needs of the people they live with and places they live in. We like how the App model of software accommodates this to some extent, giving people easy access to a variety of tools. However, there's still lots of opportunity to think about how things might be joined together better in artful ways that allow people to work more with systems and

processes, and be responsive to the social and physical environment.

CLUTTER AND MESS, AS WELL AS ORDER, HAVE VALUE IN OUR HOMES. WE USE DISORDER TO ARTFULLY EXPRESS IDEAS ABOUT HOW THINGS SHOULD BE DONE IN OUR HOMES AND WHAT REALLY MATTERS TO US.

MESS AND A MORAL LIFE

Part of any order is of course the unordered, the mess. It might seem that household organization should be targeted at ordering the mess, and of course in some cases this is true. We've found, though, that mess has an important place in the home. By putting things onto piles, into cluttered bowls and in junk drawers, people it would

seem are using sites of contained mess to preserve a wider sense of household order. First, these sites are simply easy-to-use catchalls for stuff. When we're too busy or too tired to do anything else, we put incoming post, notices from school, elastic bands, used batteries, and so on in some ready-to-hand repository. These sites of mess become handy 'holding places' before things go some place else. Yet, there's more to mess than this convenience factor.

These piles, bowls and drawers appear to be places where we can figure out what status stuff should have. These places sit, figuratively (and sometimes literally), at the threshold to the house, they are liminal spaces for stuff and mess to reside while we decide whether they're worthy of keeping or throwing out. They allow us to keep all-out mess in our homes at bay, but at the same time give us a contained place for things that don't yet have a rightful home. Letters in piles, then, can sit and wait till we act on them (or toss them out), and likewise with receipts, elastic bands, and batteries. The very nature of these places is that they permit an eclectic mix of things.

What these strategies for dealing with mess suggest is that we are, in organizing our homes, not just concerned with the practical business of sorting stuff out—sorting out who (and what) goes where. We're also caught up in the much more meaningful question of sorting out good from bad. That is, in bringing order to our homes and being forced to make decisions about what should be kept or discarded, we are enacting an order that prioritizes what we value and that defines where things should fall at the boundaries, either 'inside' or 'outside' the home. It's this that we think of as a moral order, it is an order that encompasses individual and social values, that separates good from bad, right from wrong and indeed, what is sacred in the home and what isn't.

This is relevant to those designing technology because it impinges on what we think should be automated in our homes. As we've said, there are many visions of technology-enabled homes that propose virtually everything should be automated. What we find, however,

is that the decisions people make about ordering their homes are expressions of what they value, how they enact a moral order to the places in which they live. There's no doubt we'd welcome technologies that sort clutter and mess for us, but the ways we keep things in order and sort stuff out also plays an instrumental role in shaping the places we live in. We come up with an assortment of artful systems to manage these processes, which suggests we should take great care in replacing or reproducing them. More productive, it would seem, would be to give people richer ways of working with stuff and making the decisions for themselves. This isn't to remove the automation or intelligence, but to think of it helping in more subtle ways.



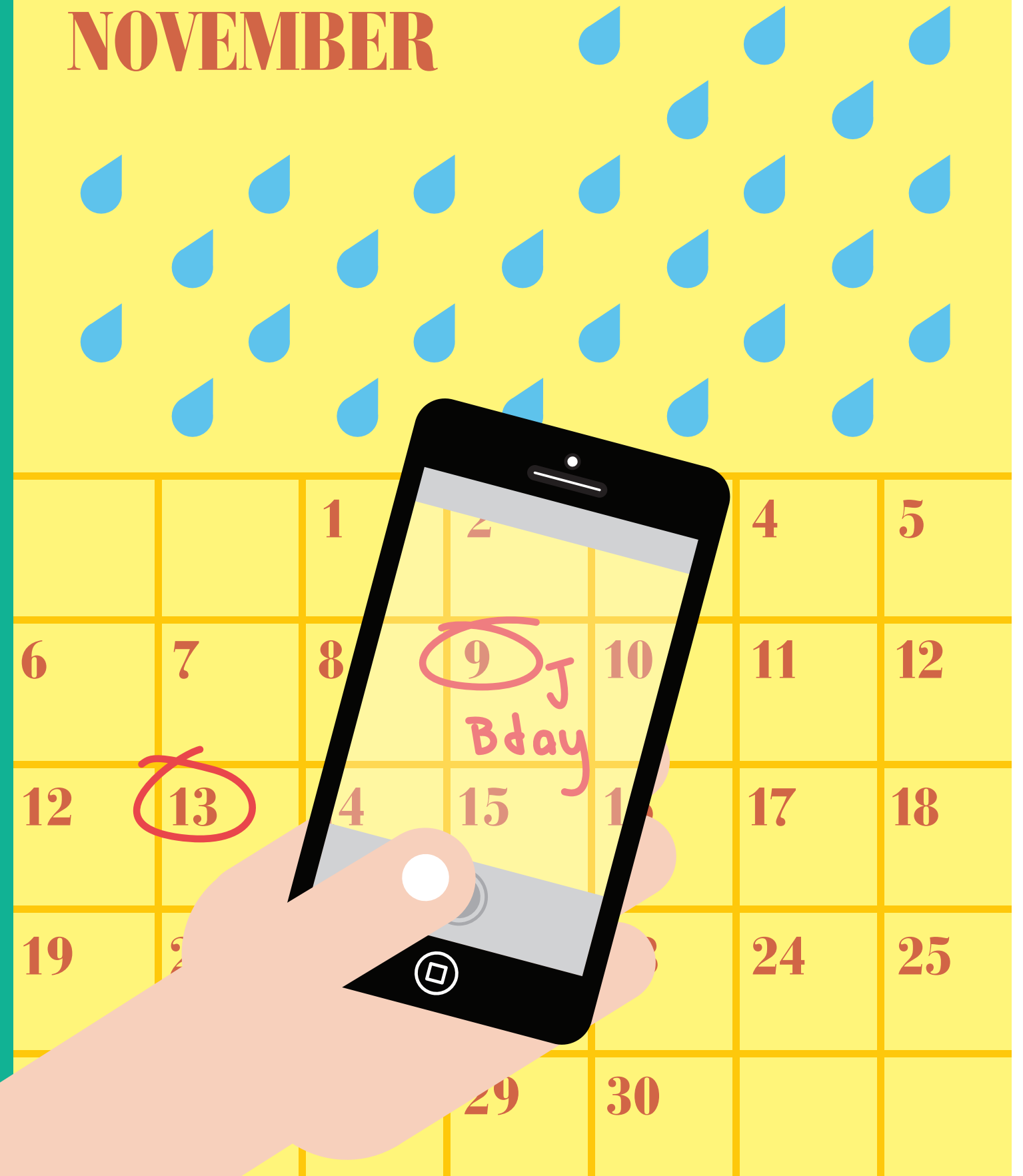
Main image: The order is disorder.



VISIBILITY AND ORDER

How can digital stuff be more like physical stuff in our homes, so it can be part of the everyday ordering of home, and sensitive to the ever-changing and nuanced ways we try to organize both the things and people we live with?

NOVEMBER



ARTFUL CLUTTER

How might we design new technologies that are open to the subtle and flexible ways we organize our stuff, helping to express the values that are important to us?



CASE STUDY

Putting things in order

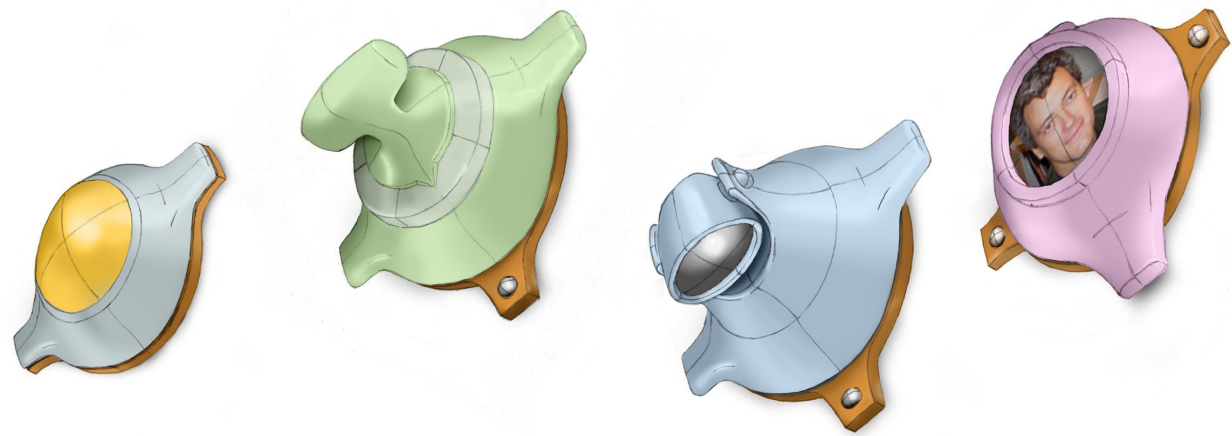
TO EXPLORE THIS AREA OF HOUSEHOLD ORGANIZATION OUR PAST WORK HAS EXPERIMENTED WITH INSTRUMENTING EVERYDAY HOUSEHOLD ARTEFACTS LIKE BOWLS AND FRIDGE DOORS. IN LINE WITH THE INTERNET OF THINGS VISION, OUR PREMISE HAS BEEN THAT IT WILL BE INCREASINGLY EASY TO EMBED TECHNOLOGIES INTO EVERYDAY THINGS. OUR PARTICULAR EMPHASIS THOUGH HAS BEEN TO BUILD ON THE DISTINCTIVE USES ARTEFACTS AFFORD.

Our vision of a digital clutter bowl, for example, exploits the familiar properties of a bowl to support the casual and informal organization of digital media. It aims to provide lightweight methods of interaction that are highly intelligible to the user. Using our envisaged system, a device's media are displayed through the simple act of placing a device in the bowl. We envisage content being 'peeled' away from its digital device and left in the bowl alongside other content. Our main assertion here is that an augmented bowl should retain its specialized containment and storage functionalities. The casual ways in which items can be literally tossed into bowls and the loose organization that results from the physical form of the bowl should be preserved because this appears to be one of the reasons why it is so compelling as a container.

Our ideas for augmenting a fridge aim to exploit how people use fridge doors as vertical display surfaces and often use

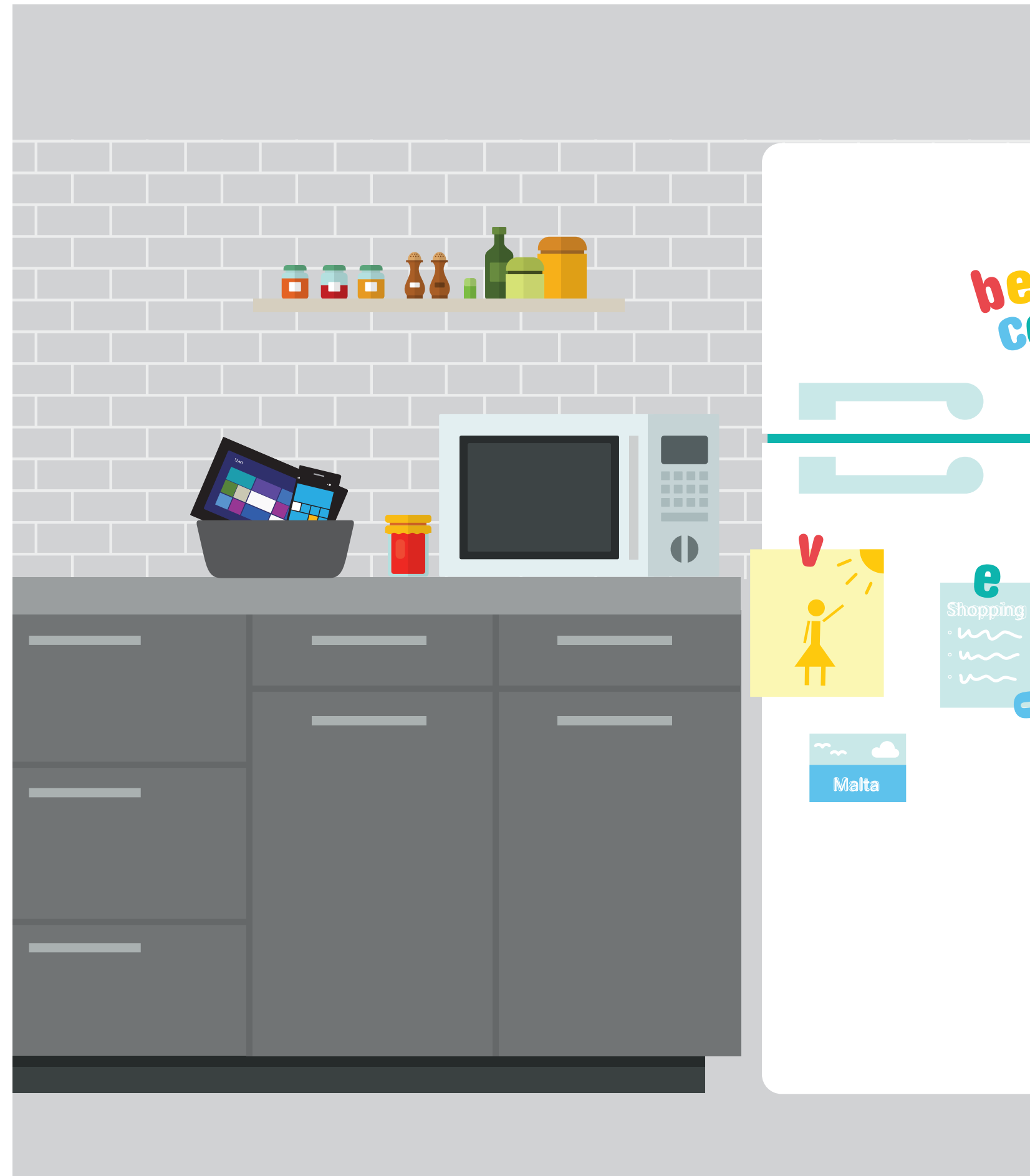
magnets to arrange and manage content. Also, what we are building on here is the social status of the fridge as a display surface. By default, the fridge is something we share in homes and that we regularly pass by and interact with, so it makes sense to think of interactive systems and devices that build on the appliance's 'public' status and its regular part in day to day routines.

With these qualities in mind, a range of magnets was designed for dedicated purposes such as timers, cameras, small displays. These can be used independently or together to augment notes, calendars or even art work attached to fridges. A core motivation in their design is to support the idiosyncratic ways people choose to organize their things and especially the highly personalized ways they arrange things on their fridge doors. Thus the aim, again, is to give people a flexible way to construct their own systems for managing and organizing things in the home.



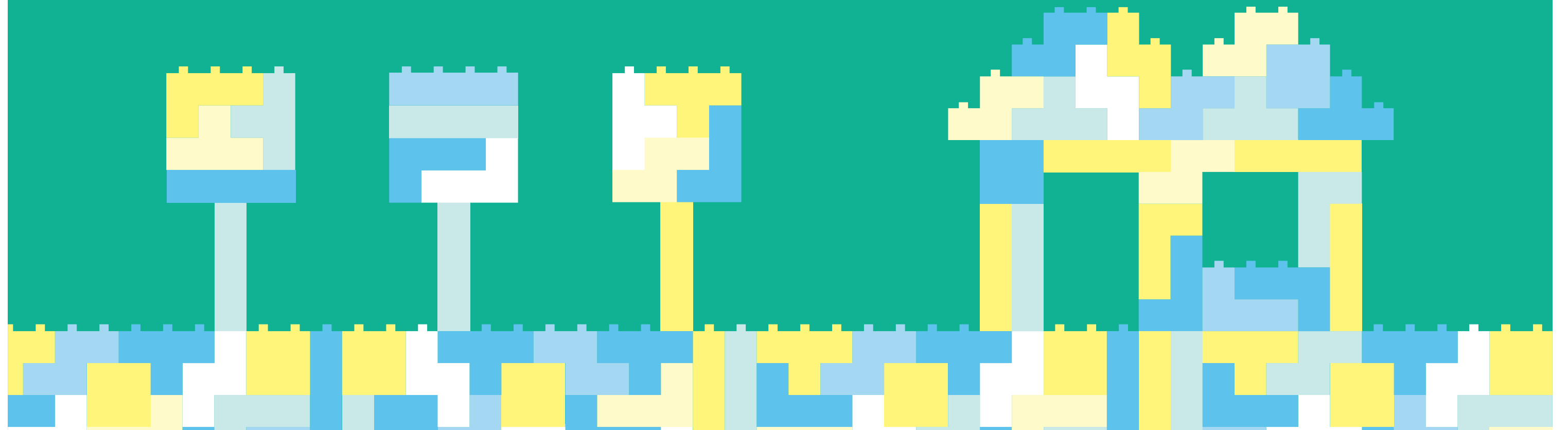
Above: Augmented fridge magnets.

Opposite page: Managed clutter.



CHAPTER 5 | PLAY

WE TEND TO THINK OF PLAY AS SOMEHOW SEPARATE FROM ORDINARY LIFE, SEPARATE FROM THE SERIOUS BUSINESS OF WORK OR RUNNING A HOME. PLAY THOUGH IS AN INTEGRAL PART OF LIVING TOGETHER. WE ARE PLAYFUL NOT JUST IN OUR GAMES, BUT IN HOW WE ROUTINELY INTERACT AND COMMUNICATE WITH THOSE WE LIVE WITH. THIS EXTENDS HOW WE MIGHT THINK OF THE TECHNOLOGIES WE DESIGN FOR THE HOME; IT PROVIDES US WITH ANOTHER SPHERE FOR EXPRESSING HOUSEHOLD VALUES AND SUSTAINING SOCIAL RELATIONSHIPS.



Supporting Play in home life

GAMES AND PLAY PROVIDE A PLATFORM FOR EXPRESSION, FOR UNDERSTANDING AND SOMETIMES TESTING OUT THE RELATIONSHIPS WE HAVE WITH THOSE WE LIVE WITH. IN THIS SENSE, TECHNOLOGIES CAN BE THOUGHT OF AS THE TOOLS FOR EXPRESSION WHEN WE PLAY. THEY SHAPE PLAYFUL ENCOUNTERS, DICTATING CERTAIN RHYTHMS TO LIFE AT HOME AND IDEAS OF HOW WE SHOULD AND SHOULDN'T RELATE TO EACH OTHER.

Long established ideas of play claim it to be a bounded activity, quite separate to ordinary life. This kind of play is defined by its own set of rules, and operates in its own boundaries of time and space. Board games and immersive video games are good examples. Such definitions, however, fail to capture the less structured and more ad-hoc forms of play that pervade everyday life. They overlook more open and ambiguous forms of play. Indeed, these conventional perspectives fail to show that play is always part of wider social contexts.

PLAY IN COMMUNICATION

Our studies of home life have helped to show that play has a significant role in our homes, both shaping and being shaped by the ways we live together. Far from something rigidly demarcated, we've found, for example, that play can be integral to the rhythms household members adopt when communicating with each other and specifically when they use technologies to send messages and share content. Much more than purely functional solutions, communication technologies in homes are used in playful gestures like jokes and riddles, and appropriated in spontaneous games. Play comes about through the unfolding patterns of turn-taking and exchange afforded by text messaging, IM, Snapchat, etc. Placed in a wider context, it's hardly surprising that this is leading to social network companies like Facebook seeking to exploit the gaming potential in their messaging channels. In homes, specifically, we come to see how play establishes a sort of common ground, where, for instance young children can be engaged by remote grandparents or quarrelling siblings can work out their own systems of turn-taking and peace-making. The point here is that play is tightly interwoven with how we conduct ourselves in our homes; play is something that can surface in small, unexpected ways through people appropriating the things they live with, including technologies.



PLAYING GAMES

Even in the world of video games—where adults and children alike can spend hours immersed in virtual realities—we've seen that play interleaves with a home's values. Unsurprisingly, these more immersive forms of play are sought out as respite from the more instrumental requirements of domestic life—we play them to “get away,” or to “switch off”. Yet this gameplay is immediately set within the values that homes hope to sustain and protect. Parents are, of course, mindful of the time their children spend playing video games. The seemingly singular rules to ration so called “screen time” can, though, mask a wider set of values including a household's attitudes towards physical play and other physical activities, schoolwork, the desensitization to mature content

(violence and sexuality in particular), and the normalization of obsessive attitudes to competition, collection, etc.

Gameplay exerts a force on home life as well. Most directly, the spatial arrangements and rhythms of households are shaped by the often long periods gamers spend on shared television screens and consoles. A rich ancillary culture has also grown up around video games, including the purchase of related merchandise (such as cards and figures) and the production of commentary and review videos (e.g. on twitch.com). Indeed, amongst some children and teenagers, we find watching videos about games is replacing listening to music, audio books, and even television and films. Video games are then constituting a social economy of sorts that intermingles with home life, knitting into and producing particular values and forms of labor.

Clearly, there are some significant differences between the kinds of play household members might participate in when casually appropriating communication technologies versus what they are doing when playing video games. Indeed, it may be fair to say that there we are dealing with two very different kinds of play. Whatever the case, there is a broader issue we want to draw out here. Whether it's a playful text message or a deeper engagement in a virtual world, what we find being produced in these kinds of play is a means to participate in social relationships. So the way rules in games, and more generally in play, are interpreted give household members the chance to express themselves and exert certain values.

IN PLAYING, WE EXPRESS OURSELVES. IN PLAYFULLY RESPONDING TO AN INSTANT MESSAGE OR JUDGING SOMEONE'S PERFORMANCE PLAYING GUITAR HERO, WE SAY SOMETHING ABOUT THE RELATIONSHIPS WE HAVE WITH OTHERS AND THE WAYS WE WANT TO CONDUCT OURSELVES IN LIVING WITH THEM.

For design, we should understand that play is bound up with the social and moral life of the home. Whatever technologies we design, households are likely to incorporate them into playful acts that express and cement particular ideas of contact, care and affection. In concrete terms, we might think about how our technologies open up the possibilities for certain spheres of play, how their constraints and rules of interaction lend themselves to certain kinds of relationships and rhythms. Naturally, we want to build in forms of parental control into online and gaming platforms, but there are also more subtle elements we might wish to consider. How might we design systems that engage users in playful interactions and exchanges (no matter how fleeting), and at the same time offer an openness? So how might we think creatively about supporting turn taking and reciprocity; about expressing conformity, allegiance and even subversion; and about supporting the expressive qualities of play by, for example preserving and displaying the traces or residue of playful interactions?

Below: Gaming's rich ancillary culture

Opposite page: Play as a platform for expression.



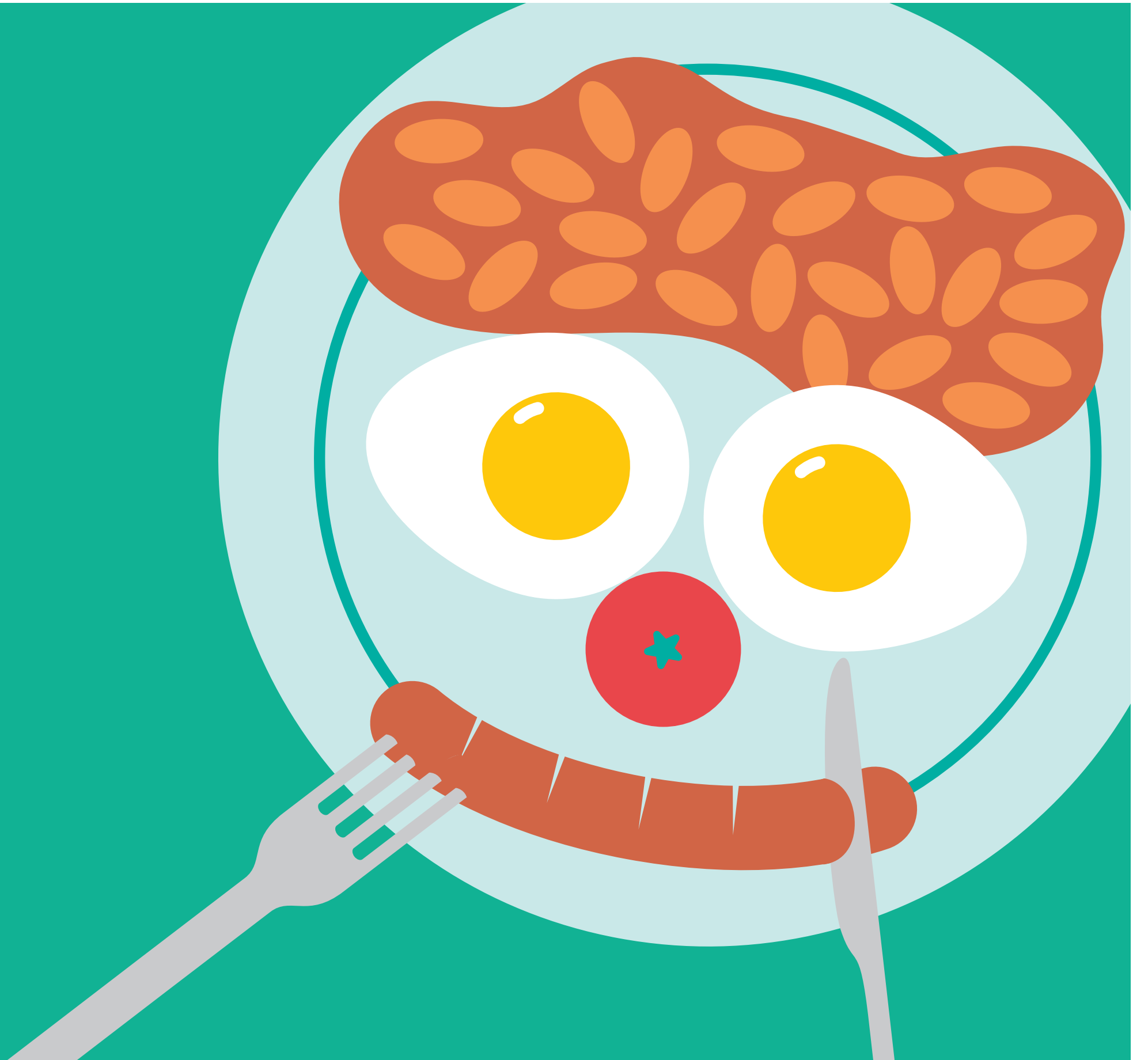
A WORLD OF PLAY

Our work has shown that playfulness is a central feature of family life, way beyond the bounds of game playing. Home communication technologies are an obvious case in point. How can home communication systems leverage creative play to enhance social bonds for people in the home, and connecting to home?



PLAYFUL EXPRESSIONS

We can open up the design space for games by thinking not just about the game players, but also the role of other people in the home. How can spectators in the home be drawn into the game experience? How might parents participate in richer ways with children? How can game play be tied into other kinds of home activities such as homework, TV watching, or even domestic chores?



A PLAY ON

Messaging offers a fruitful vehicle to explore playful interactions between those living together and apart. Much of our work has shown that household messages are used to express care and affection, but at the same time draw on forms that are witty and playful to do so. In designing Wayve, we set out to build an information appliance with the express purpose of supporting playful, situated messaging in the home. Our aim was to enable a lightweight approach to messaging that enabled users to easily combine media in creative ways, and whimsically share and respond to messages.

With a unique phone number and email address, each Wayve device can send and receive SMS, MMS and email content. Messages can be composed using handwriting and drawing, text via an on-screen keyboard, photos taken using the device's camera, or any combination of these. Thus, scribbled notes and photos can be sent as picture messages to mobile phones, as embedded images within emails, or can be messaged to other Wayves. Designed to make sending both quick and easy, the Wayve interface includes six 'favorite' slots in the address book to support one-click sending. Messages received by (or created locally using) Wayve circulate slowly so that there is a degree of visual persistence. Any content can be doodled on, and

altered versions can be displayed locally, sent back to their creator, or forwarded to others.

In an extensive trial of Wayve devices to 24 households (for an average of 88 days), we found the device being used, unsurprisingly, for a range of purposes. Especially notable across virtually all the households, though, was the presence of playful interactions. Householders sent witty messages, established simple games in exchanging messages, added humorous drawings and embellishments to photos taken with the device, and so on. We categorized the types of play as follows:

- Playfulness in Messaging: the richest category, where messages took playful forms in a variety of ways;
- Play via Wayve: where Wayve acted as the conduit through which structured games were played;
- Play around Wayve: where Wayve became a part of collocated play;
- Play with Wayve: where the device itself inspired creative activity.

Critically, it appears particular aspects of Wayve's design readily lent itself to these kinds of play. First, the combination of pen-based input, photos and the instant accessibility the device provided an opportunity for



freedom and flexibility of expression not usually seen in most messaging devices. Second, the limited and thus simple constraints (e.g., pen-based color input, easy replies, relatively small screen, front-facing viewfinder) afforded quick scribbling, snapped photos, etc. As a consequence, the messages were almost exclusively informal. Third, the physical location of the device in people's homes more often than not dictated a particular kind of content, i.e., household messages between friends and family, as opposed to work. Lastly, the turn-taking qualities of messaging (as well as the pen-based input), instituted reciprocal interactions where other local users might add captions and embellishments to messages or remote users might initiate simple, rule-bound cycles of messages and replies.

Naturally, each of these qualities by themselves didn't determine the playful uses of Wayve that we observed. However, the trial provided insights into how an important aspect of family life, namely play, is afforded by certain qualities of design and interaction. This, in turn gives us scope for intentionally incorporating such qualities into device

and service design, building on things such as simple constraints, simple tools for creativity, reciprocal exchange, and preserving a 'residue' of interactions to support and encourage playfulness.

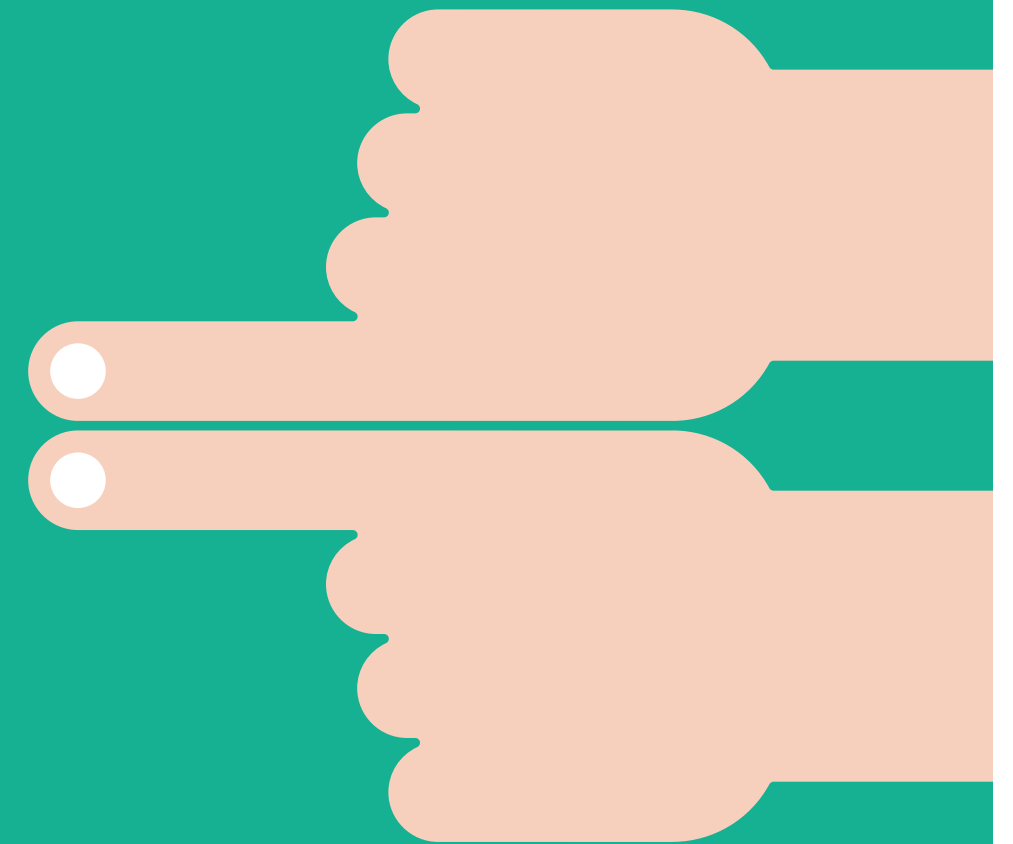
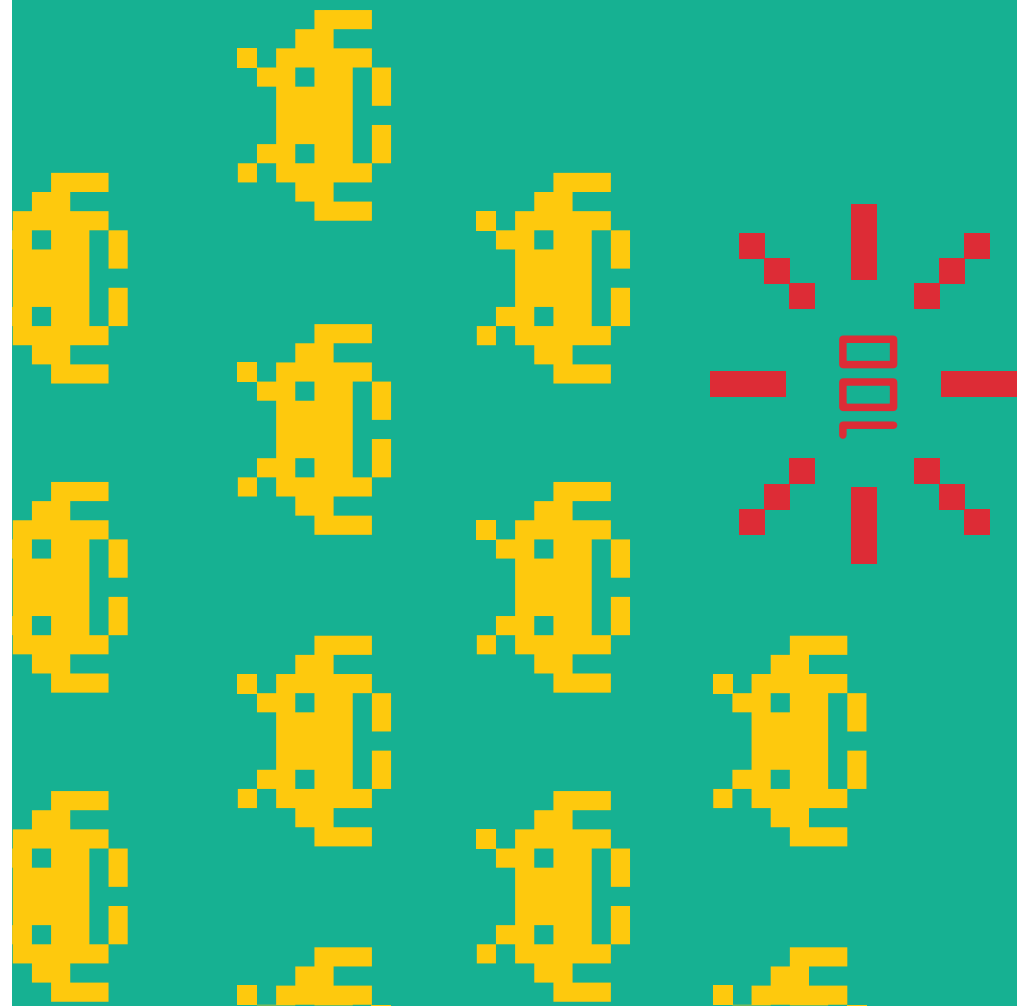


Above image: Wayve messaging.
Below images: Wayve in use.



CHAPTER 6 | THE FUTURE OF INTERACTION IN THE HOME

A NEW CLASS OF SOPHISTICATED TECHNOLOGY IS PROMISING TO ENTER THE HOME, ONE TARGETED AT TRANSFORMING HOW WE INTERACT WITH EACH OTHER AND OUR HOMES. USING ADVANCED MACHINE LEARNING TECHNIQUES COMBINED WITH THE PROLIFERATION OF SENSORS SUCH AS CAMERAS, THESE TECHNOLOGIES ARE SET TO DISAPPEAR INTO THE INFRASTRUCTURES OF OUR HOMES ENABLING US TO USE GESTURES, BODY MOVEMENTS AND EVEN OUR MERE PRESENCE AS WAYS OF INTERACTING WITH TECHNOLOGY.



"Natural" interaction at home

WITH MACHINE LEARNING AND COMPUTER VISION PROMISING TO ENABLE MORE NATURAL FORMS OF CONTROL IN OUR HOMES, HOW ARE WE TO IMAGINE AND DESIGN NEW KINDS OF INTERACTIONS WITH OUR PHYSICAL AND COMPUTATIONAL SURROUNDINGS? WHAT MIGHT WE WANT TO CONTROL AND WHAT, EXACTLY, WOULD WE CONSIDER TO BE MORE OR LESS NATURAL FORMS OF INTERACTION? THE PRESENCE OF MACHINE LEARNING AND COMPUTER VISION SYSTEMS IN OUR HOMES RAISE FUNDAMENTAL QUESTIONS ABOUT NATURAL USER INTERFACES, AND MORE GENERALLY THE RELATIONSHIPS WE WANT WITH 'INTELLIGENT' MACHINES.

This final chapter considers the place of more future-looking technologies in the home. Touch displays, messaging devices, personal information management systems, and so on offer plenty of opportunities for thinking imaginatively about the role for technology in the home. However, advances in machine learning and computer vision are making possible entirely new ways of interacting with digital systems that seem extraordinary precisely because they are somehow foreign and unfamiliar.

The Kinect camera for Xbox provides an example of how these innovations are introducing quite different possibilities. Sensing us through gesture, body movement, and face recognition there are opportunities for interacting and controlling computers in wholly different ways. Microsoft's HoloLens offers a further example, showing how the developments in vision systems and their incorporation into wearables provide a viable way of capturing and rendering 3D space and, as a consequence, introduce new kinds of experiences that merge the physical and digital worlds, often called "augmented reality".

The fact that Kinect and HoloLens might be a means of interacting with a home's technology is a vision that is not far removed from those early envisions of the smart home we mentioned in Chapter 1.

ON THE FACE OF IT, THE UNDERLYING GOAL IS THE PROVISION OF A SMART OR 'INTELLIGENT' SYSTEM THAT IS SEAMLESSLY INTEGRATED INTO

OUR LIVES AT HOME, AND THAT OPERATES IN THE BACKGROUND AND SERVES UP APPROPRIATE COMPUTING FEATURES WITH LITTLE HUMAN EFFORT.

In so doing, intelligent systems are seen to provide a kind of backbone to life at home, ever-present and always ready to respond.

YOU ARE THE CONTROLLER

Consider Kinect as an example of this new breed of home technology. An early series of commercials for Kinect used the tag line "You are the controller." In the ads, we see a sequence of people mostly, but not exclusively, in their homes dancing, leaping, swaying, and gesturing. Gradually, we come to see they are controlling their Xbox consoles and the content on their screens. More than this, the ads emphasize an absence, and attention is drawn to how something is missing in the relationship between the human and the screen. Claims are made that there is no 'how' when someone interacts with Kinect. Indeed, the claim is stronger than this: it is that there is no interface at all. This is because, as the adverts put it, "You are the Controller".

Obviously this is meant as pure publicity, yet there is much to consider in what is being emphasized in phrases such as this. What is being proposed is that, with Kinect, there is correspondence between, on the one side, people and what they want to do, and, on the other, the machine's ability to understand, grasp, comprehend or, in this case more



Above image: You are the controller.

accurately, to 'see' what those intentions are and then respond to them. This is linked to the fact that Kinect can 'interact without any intermediation—no keyboard, mouse-clicks or joystick. This is to not only celebrate the removal of any mechanical means for controlling computers, but to go one step further to suggest that this means that future systems will understand our intentions.

Whereas once the computer mouse might have been the center of an advertising campaign, now in a world where the technology can let you be the controller, the technology disappears. This future holds less, less technology to get in the way. Again, we find ourselves back to the visions of the smart home. In our future homes, we are allowed to be

'natural'. All other means of interacting with a computer are, by dint of this phrase, implied to be somehow other than natural. The keyboard was merely a technological step on a path to this 'natural' mode; the computer mouse simply a cute technological aid that, like the keyboard itself, is soon to disappear.

HOME CONTROL

So, what is one to make of the phrase 'You are the controller' and relatedly the term 'natural'? The trouble with both is that they are thick with meaning—but it's not just that they are vague; it is that they are too evocative. And this sense is more acute when we think about them in the context of the home. For example, the word "natural" is bound up with what its



use implies about being unnatural. Given that Kinect does away with a keyboard or even a stylus, one interpretation could be that people do not ‘naturally’ want to communicate by written words—by jotting a note on a Post-it™ for the fridge, for instance. Doing so is an artifice of the technology and, one might think, could be abandoned when something better comes along, something we might think of as more natural. But as we have seen, paper notes and scrawls on wall-hung calendars are readily used to do certain kinds of communicative work—it is their persistent qualities and high visibility that make them, well, such natural things to use.

With the new class of interactions afforded my machine learning systems, questions are raised about what it is to be in control when these systems analyze and interpret our behaviors out of sight?

Consequently, when Kinect is said to offer users a more natural form of interaction what is it we should be looking to contrast it with? It would appear not to be the creation of text. Might we narrow in on a set of movements and gestures, a grammar if you will, that somehow comes naturally to us in our homes? The trouble is, as we have seen in this issue, it is the relations we continually craft with things that matter to us, not some intrinsic or natural quality to those things or how we use them. So what seems far more important than any presumed idea of what is natural, are the capacities technologies give us to very visibly assemble and organize the people and things in our homes, to openly cement and nurture those relationships that matter to us.

What also should one make of the phrase ‘You are the controller’? Is a person not a controller when they use modalities other than bodily movement or other kinds of input technologies? Does an individual somehow relinquish some control when they have to use things like pens to make lists or a device’s soft keyboard to send messages? Indeed we might also argue that as sensors disappear into the landscape of our home we might feel less in control.

The point is, that in considering the home, it seems more helpful to think of control in a wider sense, one where the erratic, fluid and messy qualities of life are, if not always celebrated, seen to have their place. Thus, while one might value the ease and simplicity of a gesture, at times—amongst those we love and care for—we come to cherish moments where the controls are, if you will, turned down, where our actions have unexpected consequences that take time to surface. We dim the lights, use candles, play music in anticipation of a mood, not to control it like a switch, but to allow for something to happen. The control through Kinect would seem, then, to allude to something else, to be something that might be about directness and immediacy.

THE WAYS MACHINE LEARNING RECOGNITION SYSTEMS LIKE CORTANA, KINECT AND HOLOLENS WORK WILL TAKE ON VERY PARTICULAR MEANINGS IN THE HOME. HOW MIGHT WE TUNE THESE SYSTEMS SO THAT THEY MAKE SENSE IN LIFE AT HOME, SO THAT THEY “NATURALLY” FOLD INTO AND ENHANCE HOW PEOPLE LIVE TOGETHER.

HOME BODIES

The bottom line is that even though the interactions that Kinect, Hololens, and so on enable might indeed be immensely appealing and may make users experience a new sense of control and wonder at how easy and ‘natural’ they seem to be, there are important issues to contemplate when we put these technologies into the world. When we think about the home, ‘just what’ the experience of machine learning and vision systems are, what they afford and how they can be designed around, need careful investigation. The questions we’ve raised here are not meant as criticisms of the

capabilities of Kinect or similar innovations, but to ask how we should approach situating novel technology into the lives of people at home.

What we’ve sought to show is that it is not only the impressive achievements of programming a machine to see bodies that is at stake here. What matters is how the bodies are seen, and how, exactly, they are seen in relation to the people and things we live with. Pushing the machinery of ‘seeing’ and ‘controlling’ into the background—noted only by its absence—raises the vexing problem of how, sometimes, we want our doings to be visible. We want to make visible, for example, the work we’ve put into ordering stuff and why it has been ordered in just that way. So we need to work out how machinic ways of seeing things and the types of natural controls this affords might be relevant in people’s home lives, why and how they might play a role in our efforts to control things in highly visible ways.

PARADOXICALLY, SOPHISTICATED MACHINE LEARNING SYSTEMS THAT AIM TO SUPPORT ‘NATURAL’ INTERACTION, HAVE THE POTENTIAL TO MAKE CONTROL LESS VISIBLE AND THUS LESS



Above image: Ways of the hand.

Opposite image: The naturalness of communication

INTELLIGIBLE. A BALANCE NEEDS TO BE STRUCK BETWEEN THE SUPPOSED NATURALNESS OF INTERACTION AND THE EXTENT TO WHICH PEOPLE REALLY WANT TO MASTER AND CRAFT THEIR ENVIRONMENTS.

As with the themes we have dealt with elsewhere in this magazine, the directions we follow mustn’t be targeted at fixing presumed ‘problems’ in the home, for these are too many and varied, but at providing enablers for people to craft their homes in the ways they want. With Kinect, Cortana and now Hololens, our challenge is how to approach, with care, the sophisticated tools we use to recognize and interpret our interactions. The danger is we burden our homes with tools that inadvertently hide or obscure the actions that are important to us, or that misalign with the forms of control—natural or otherwise—that are relevant in particular settings and activities. By approaching the home as a place that is continuously being worked on, the focus should be on enlivening and expanding the things we do to make our homes special, and within this finding those opportunities for the particular and sometimes peculiar ways computers see and interpret things.

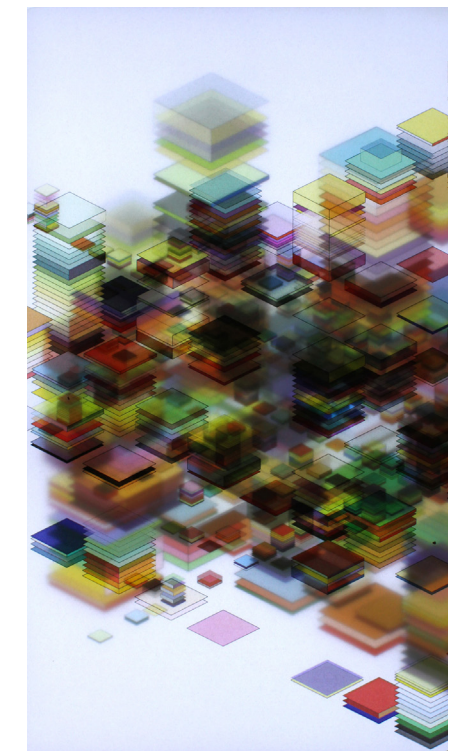
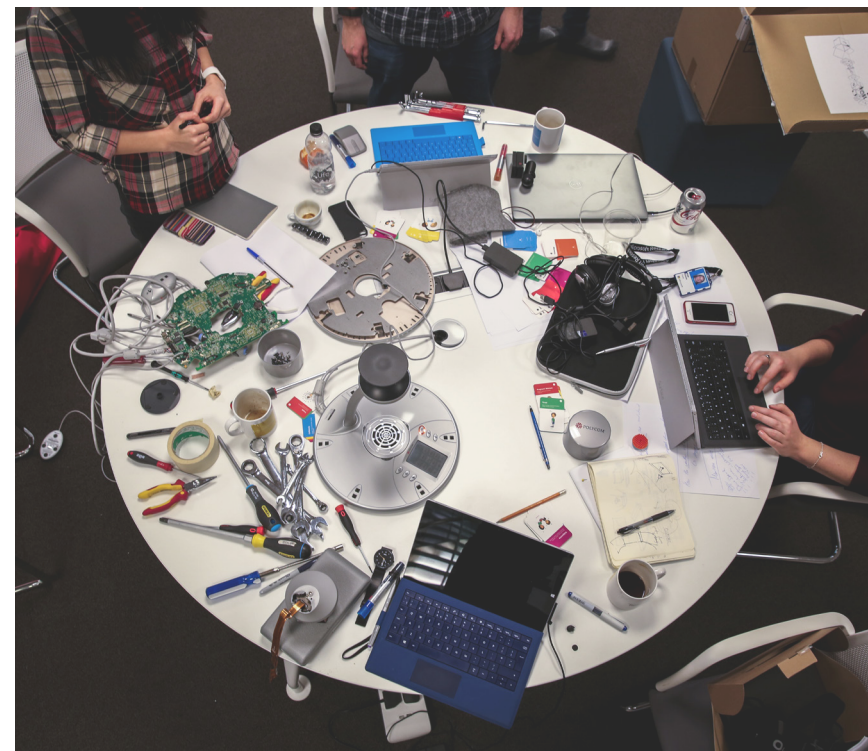
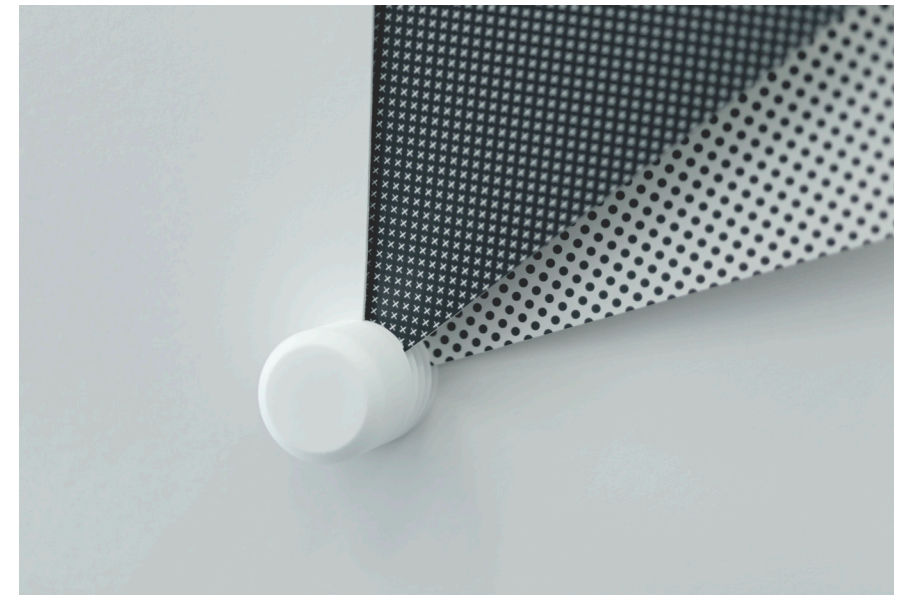
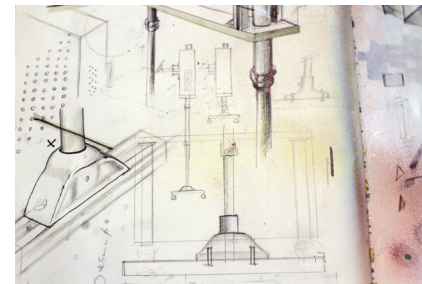
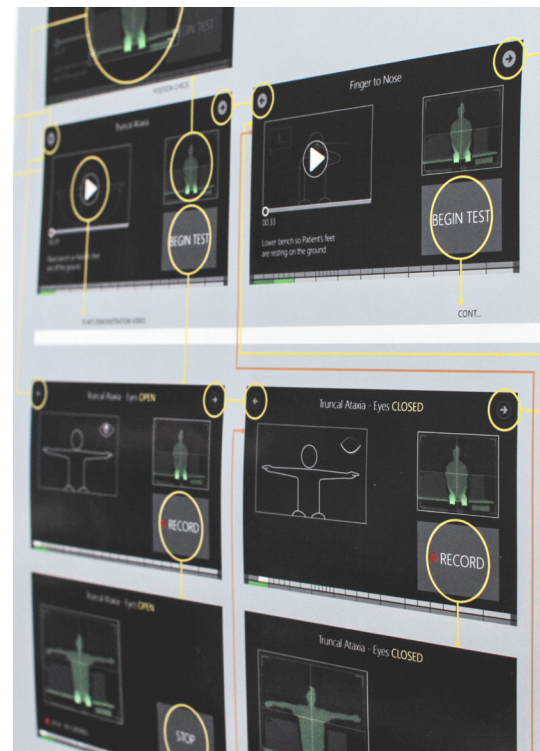
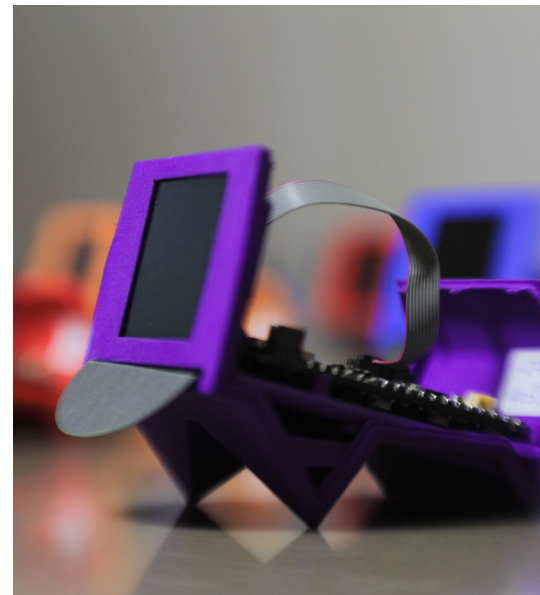
HUMAN EXPERIENCE & DESIGN

Human Experience & Design (HXD) is one of the research groups at Microsoft Research in Cambridge, UK. As a group, HXD aims to use an understanding of human values to help change the technological landscape in the 21st Century. Beyond making us all more productive and efficient, we ask how we can build technology to help us be more expressive, creative and reflective in our daily lives.

Our group considers a broad range of human values, aims to understand their complexity and puts them front and centre in technology development. An important aspect of this endeavour is the construction of new technologies that, in turn, we ourselves can shape. In so doing, we may create new ways that help us to actively realise our aspirations and desires, to engage with or disconnect from the world around us, to remember our past or to forget it, to connect with others or disengage from them. Important here are technologies which ultimately make our lives richer, and which offer us choice and flexibility in the things that we do.

HXD does this through the bringing together of social science, design and computer science. We believe that by understanding human values, we open up a space of new technological possibilities that stretches the boundaries of current conceptions of human-computer interaction.

For more information on our group, and our current themes, projects and publications, please visit hxd.research.microsoft.com



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