We need to rethink our assumptions.

The material realities of technology and their settings of use are changing. The activities and values we support with technology are changing. The perspectives that we use to understand interaction are changing. It seems likely that the assumptions we bring to designing digital technologies need to change as well.

Assumption 1:

~~Design should be based on scientific theory and study.~~

Empathy and inspiration are invaluable in designing for everyday life.

Scientific theory and empirical testing are useful for guiding interaction design, but they are neither necessary nor sufficient.

Determining what is worth doing with digital technologies involves human motivations and morals difficult to approach from a scientific standpoint. Empathy becomes a way of sensitising oneself to these issues through resonance between ones own motivations and ethics and those of others.

In addition, it is the creative leap of invention that actually produces new designs. Scientific theory and data can help guide technological development, but they are only two of a number of possible conceptual influences on inspiration; what is important is to create the setting in which inspiration might occur.

The prevalent rhetoric in HCI about 'solutions' biases the aim of interaction design towards solving problems, but this is only a limited conception of technologies' potential.   Think back to the Macintosh - programs like MacPaint or MacWord didn't solve acknowledged problems in the world, they added new possibilities such as desktop publishing. Similarly, as digital technology moves into our everyday lives it can go beyond merely solving current difficulties to offer new activities and experiences.

In addition, the danger of seeking to find design opportunities that are clearly relevant for the widest possible range of people is that the results are not very interesting to anybody. As an alternative, it can be useful to focus design efforts around the particular needs and interests of one or a few people. The resulting designs are likely to embody a strong point of view or narrative, which like a powerful story will find wide-spread appeal despite being focused on a particular time and place.

READING:
Dunne, A. (1999). *Hertzian tales: Electronic products, aesthetic experience and critical design.* London: RCA:CRDResearch Publications.

Assumption 3:

~~Systems should provide unambiguous solutions.~~

Ambiguity can be a powerful tool for provoking imagination
and insight.

Finally, the assumption that systems should be unambiguous can take away freedom from users. Systems that clearly convey their designers' intentions about what they are for, how they are to be used, and what they mean run the risk of being didactic and limiting.

Ambiguity can be a valuable resource for design, allowing designers to raise issues and possibilities without constraining how users respond. Ambiguity works at three levels in interaction design: *Ambiguity of information* finds its source in the artefact itself, *ambiguity of context* in the sociocultural discourses that are used to interpret it, and *ambiguity of relationship* in the interpretative and evaluative stance of the individual. In each case, users are encouraged to construct their own meaning in underspecified situations, which can lead to experiences that are richer and more engaging than when meaning is clearly specified in advance.

READING:
Gaver, W., Beaver, J., and Benford, S. Ambiguity as a resource for design. *Proceedings of CHI'03*, New York: ACM Press.

Examples

The best way to understand how ambiguity, idiosyncrasy, and empathy can empower new sorts of interaction design is to examine examples of this style of design.

In fact, this is the way that designers usually work - rather than articulating theoretical principles (of the sort we have tried to sketch in the last few slides) they use exemplary designs to embody possibilities and arguments.

Here we present a number of examples of recent interaction designs that explore and embrace subjective approaches to everyday life.

The Pillow   (Tony Dunne)
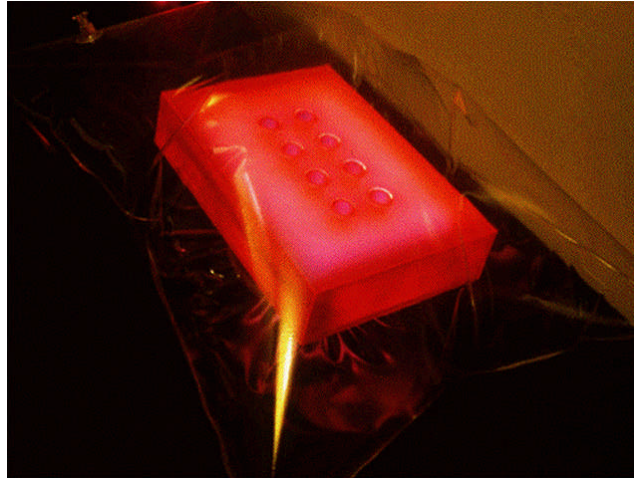
The Pillow is a concept design by Tony Dunne. A kind of impressionistic radio, patterns of light and sound infuse the object in response to ambient electromagnetic information from, for instance, cellphones, baby monitors, taxicabs, and radios.

The Pillow presents an alternative to traditional interface design aesthetically, functionally, and culturally. The device's LCD screen is embedded in a translucent plastic brick, which is in turn enclosed in a transparent inflatable pillow, resulting in blurred and diffused graphics that provide an aesthetic contrast to more typical hard-edged electronic displays. The electromagnetic information picked up by the device is fragmented and translated to coloured patterns and processed sounds, so that the emphasis is less on the exact information being conveyed than it is on its ebbs and flows. Finally, the Pillow raises the issue of ambient information and suggests a story about how we might respond, enticings viewers into a voyeuristic role towards the information that shares our spaces.

Dunne calls designs like the Pillow 'value fictions.' These use plausible technologies in service of unusual cultural values, and serve both to suggest new functions for technology and as a criticism of existing uses.

READING:
Dunne, A., and Gaver, W. The Pillow: Artist-designers in the digital age. Proc. Of CHI'97 Companion (Atlanta, 1997), ACM Press.

Alternatives   (Bill Gaver & Heather Martin)
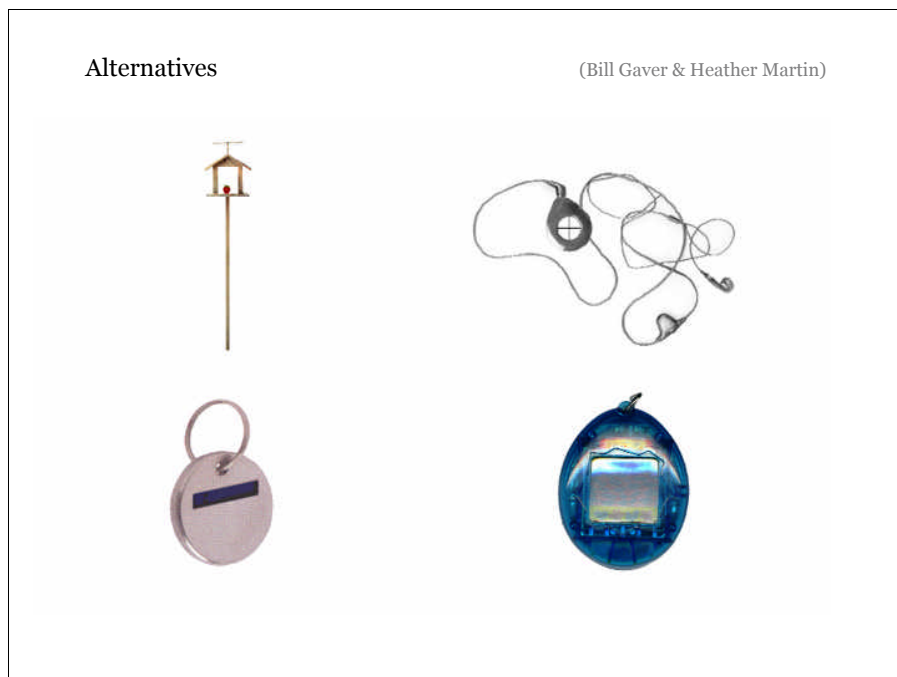
The Alternatives project was a series of sketch designs for information appliances by Bill Gaver and Heather Martin. Developed as part of a collaboration with Hewlett Packard, IDEO Product Design, and Appliance Design Ltd., the Alternatives proposals were intended to go beyond the conventional activities and values supported by most industrial and academic visions of future information appliances. The proposals explored a wide variety of values, from influence to intimacy, wandering to wondering, that might be supported electronically.

There were about 20 proposals in all, separated into groups for the home, the street, intimacy, and wonder. For instance, on the top left is the Dawn Chorus, an artificially intelligent feeder that uses operant conditioning to teach local birds new songs. On the top right is the (De)tour guide, an audio-only device that uses GPS and orientation sensing to guide people within the city - with the option of getting lost for a determined time. The bottom left shows the Worry Stone, a simple voice entry to-do list that takes over the user's fretting by endlessly displaying items as quickly as possible. Finally, the image on the bottom right is the Telegotchi, a buttonless virtual pet designed to exercise psionic powers.

READING:
Gaver, W., and Martin, H. (2000). Alternatives: Exploring information appliances through conceptual design proposals. Proc. CHI'00 (Den Haag). ACM Press.

Thrilling Fish Cage   (Maywa Denki)

Uke-TEL
A thrilling 'fish cage' with a special device. The hanging needles fall from the roof in time to the telephone time signal and may hit the unlucky fish swimming at the bottom. (caption)

The 'thrilling fish cage' by the Japanese designers Maywa Denki is an odd combination of aesthetic elegance, ritual, and cruelty.   Its internal logic is strong and even seductive, but it is also a profoundly disturbing device, giving rise to a mixture of fascination, appeal, humour and horror. What would your reaction be if you acquired it, perhaps as a gift? What sort of person would have this in their home? Do we already have such devices at home to which, perhaps, we are insensitive?

Like the Alternatives proposals, this design is conveyed only by an image and short caption. But a strong - if strange - narrative experience is conveyed, mixing the excitement of a video game with the implacability of a machine.   Like the Pillow, this may be a critical proposal - but it clearly offers a new vision of technology for the home.

Inculpable Killing Machines   (Stuart Penny & Gianni Tozzi)

In a project at the Royal College of Art, Stuart Penny and Gianni Tozzi designed a series of 'inculpable killing machines' - mousetraps that manipulated the awareness of responsibility in various ways.

Some of the traps (such as the one shown here) used symbols to give mice fair warning of danger. Others set up moralistic conditions for execution: for instance, one held three pieces of bait with only the last connected to a trap, so that only greedy mice would be killed. Finally, some allowed users to determine whether or not a particular mouse would be killed, for instance by sending a text message to the user asking for a symbolic thumbs up or thumbs down decision.

The Inculpable Killing Machines benefit from a dark sense of humour, but they are not merely jokes. Instead, they are explorations of the ways that devices can numb or sensitise us to the consequences of our actions. Like the Pillow, they suggest new attitudes towards phenomena that are so ubiquitous as to be overlooked, and thus allow us to appreciate them anew. Like the Thrilling Fish Cage, they deal with notions of cruelty to animals - but here in a realistic, even mundane context.

Wishing Well (Stuart Penny & Gianni Tozzi)

The Wishing Well in an electronic device for a garden or park. A backlit sign exhorts passersby to 'make a wish,' and a telephone number is provided. Wishes, sent by SMS message, cause a glowing dot to appear on the bottom of the well. This fades over time until it ultimately disappears.

Designed by Stuart Penny and Gianni Tozzi while students at the Royal College of Art, the Wishing Well explores the role of magic and belief in everyday life, and the possibility for electronic devices to inhabit this realm. As 'wishes' light and fade at the bottom of the well, we are encouraged to imagine that they might be received by some one or something, that they might actually come true.

The Wishing Well also questions the notion of electronic functionality. Once wishes are sent to the Well, they are inaccessible. Although it would have been possible to send random wishes to passersby via SMS (e.g. in return for making a wish), this technological temptation was resisted. Similar to the Telegotchi, the Well depends on the viewer's willingness to project meaning and belief for the situation to appear causally effective.

RESOURCE
http://www.interaction.rca.ac.uk/alumni/00-02/gianni/

Playful Photography   (Bill Gaver & Heather Martin)
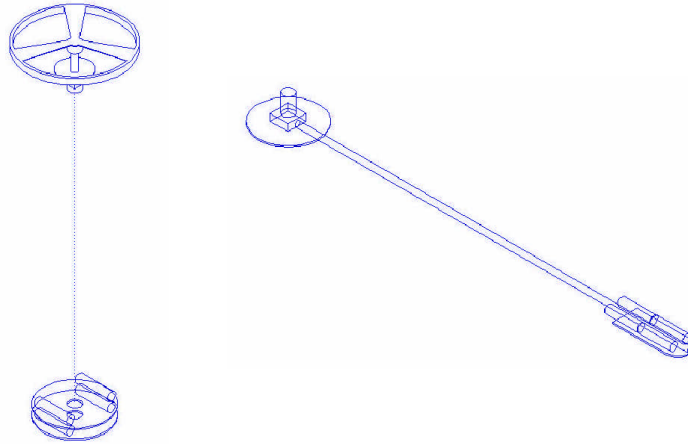
In a development of the Alternatives work pursued in collaboration with Hewlett Packard, IDEO, and Appliance Design Ltd., Bill Gaver and Heather Martin developed a series of cameras that explored the playful possibilities of photography.

For instance, the drawing on the left shows a camera that can be launched into the air to take a picture from above - a development of an Alternatives proposal for a camera that would help users find emotional perspective by seeing themselves from afar. The camera on the right has an extendable arm for capturing images from unusual perspectives - perhaps over the heads of a crowd, or peering into an otherwise inaccessible nook.

These and a variety proposals explored the notion that by introducing new affordances to cameras, the kinds of images people might take and their relationships to photography might change. Offering the electronic means for finding new perceptions of the world, such cameras might spark people's curiosity and lead to new insights as well as pleasure.

READING
Martin, H., and Gaver, W. (2000). Playful photography: From speculation to prototypes. Proc. Designing Interactive Systems 2000, ACM Press.

Weeds, Aliens and Other Stories   (Dunne+Raby & Michael Anastassiades)
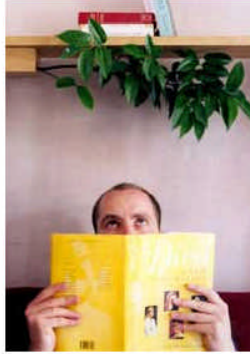
Rustling Branch: an alternative to the vase, sounds replace appearances

Weeds, Aliens, and Other Stories is a collection of psychological furniture for the home and garden.

A variety of electronic and mechanical devices explores the relationship of people with their gardens, and ultimately with nature. For instance, the 'rustling branch' is a shelf which periodically vibrates a leafy branch to replace the visual preoccupation of vases with an auditory alternative. Other designs include the 'garden horn,' a long tube for speaking to plants in the back of the garden, a 'cucumber table,' with a glass tube for ensuring that vegetables are straight, and the 'cricket box,' used to record sounds from the garden for later replay in the home.

The designs for Weeds are understated and whimsical, capturing an eccentric view of people's relationships to their gardens. But soft-spoken though they might be, they are a powerful admonishment that the mass-produced world of consumer goods only captures a small portion of the pleasures we might find in the garden. By looking to more individual and idiosyncratic perceptions, the Weeds furniture tells enchanting stories of how products can enhance domestic pleasure.

READING
Anastassiades, M., Dunne, A., & Raby, F. (2001). *Weeds, Aliens, and Other Stories.* London: Salvo.

Drift Table   (Gaver, Gellerson, Boucher, Pennington, Schmidt & Walker)

The Drift Table is a coffee table with a built-in 'porthole' showing slowly scrolling aerial photographs of England. Changes of weight on the table control the table's apparent height over the ground and the direction of its travel, giving the impression that the table is floating over the British countryside.

Two tactics are used to make the embedded LCD screen appear as an opening rather than a flat display.   First, the screen is below the table surface and larger than the opening, so that moving one's viewing angle reveals new portions of the scenery. Second, a Fresnel lens is mounted over the screen, causing it to distort and blur when viewed from the side, enhancing the impression of depth.

The Drift Table shows detailed, accurate images of England, and thus can provide a resource for learning or speculation. But this is not its primary purpose. Instead, it is intended to create a kind of opening in the home that can lead to daydreaming and imagination. It provides an alternative to more task-oriented uses of 'ubiquitous computing,' and also illustrates the potential of 'reticent sensing' which captures only enough information to allow interesting responses.

The Drift Table is being developed as part of Equator, a long-term collaboration among eight UK universities sponsored by the UK Engineering and Physical Sciences Research Council; it is also sponsored by Hewlett Packard and GetMapping.com.

Subjectivity and Design

    - from needs to intrigues

    - engaging with people as inspiration

    - exaggeration and ambiguity

These examples all embody an approach to the design of technological systems that contrasts with the scientific and engineering approaches that were predominant in HCI of the '80's.

As we have discussed, they share to a great degree at least three features. First, they do not focus on providing 'solutions' to problems or needs, but seek instead to support, uncover, and even suggest new interests and activities that might be engaging, pleasurable, or thought-provoking. Second, they are not based on scientific data about 'typical' users, but instead on stories about unusual values and desires. Finally, they do not seek to provide clear functionality, but often use exaggeration and ambiguity in creating a kind of narrative context for people to find their own stories.

It is common for people to label designs such as these Art - seemingly because this helps to compartmentalise the challenges they offer from 'real life.' But while these designs may draw on tactics from the contemporary arts, they are intended as designs, meant to serve practical purposes in people's day to day lives. What is unusual and perhaps disturbing about many of these examples is that the purposes they serve and the roles they suggest have less to do with clear practicality, and more to do with experience. They are decidedly subjective, and seek to raise subjectivity as a practical daily concern.

The Cultural Probes materials were simple , but they were the manifestation of an approach to design that is shaped by a number of influences.

 In this section we discuss some of the conceptual issues behind the Probes, describe inspirations from the arts, and outline some of the features of the Probes approach that seem important for their success.

Why not use existing methods?

We didn't want to constrain the dialog (e.g. questionnaires)

We couldn't observe from a distance (e.g. ethnography)

We wanted to be told of hopes, fears, dreams...

We didn't want to remove our identities from the process

We wanted to create pleasure, not work (like our designs).

We developed the Probes in part because of our reluctance to use existing methods. There were practical reasons for this - for instance, we couldn't make protracted visits to the sites - but most of our reluctance had to do with an aesthetic of design research.

Methods based on science, we believe, have a tendency to separate the researcher from the people they are studying. Because of science's aim to be generalisable, the subjectivity of the researcher is suppressed, leading to the ideal of objectivity and a tendency to rely on quantifiable data. However, this tends to encourage researchers to take the role of experts, while participants try to fulfil the role of a good subject.

We sought to disrupt this with the Probes to create a more complicated and uncontrolled form of engagement. We wanted the Probes to be part of a pleasurable process that would continue with our designs - not to provide information as an end of research, but inspiration as a means for design.

Thus we subverted our own role as experts in a number of ways: revealing our own interests and uncertainties, encouraging the older people only to complete the materials that interested them, and including absurd and playful tasks. At the same time, we encouraged the older people to tell us not only of the actualities of their lives, but of their hopes, dreams, and fears - we even suggested that they could tell us stories or lie to us.

Inspirations: The Situationists
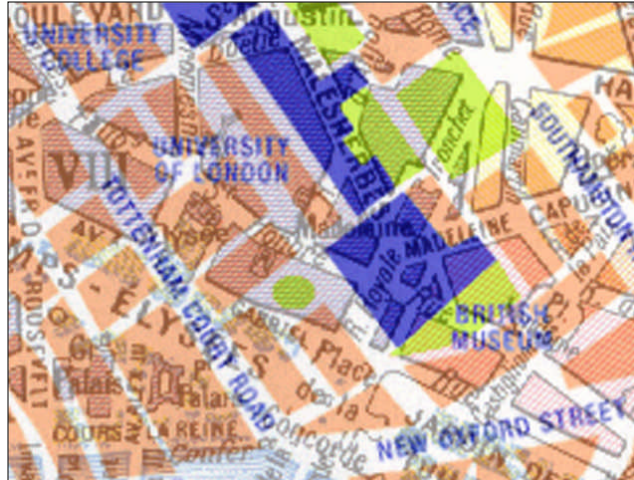
Our approach to the Probes was inspired in part by examples from the modern arts.

For instance, the Situationists were a loose collective of artists who pursued a radical political agenda through their work. Following in the footsteps of the nihilistic Dada and the fantasy-obsessed Surrealists, the Situationists used tactics of absurdity and subversion to find liberation from society's conceptual and aesthetic constraints. They decried the commodification of everyday life but were uninspired by grim revolutionaries, and so sought to create situations that would reflect a post-revolutionary society.

The Probes drew both from the spirit of the Situationists and their specific tactics. For instance, they misused and subverted existing objects and images to protest commercialisation, and set up situations that were purposefully confusing and absurd. Their 'psychogeographical maps' plotting the emotional landscape of the city were directly influential both in the probes and our designs.

READINGS
Andreotti, L. and Costa, X. (eds.), Situationists: Art, Politics, Urbanism. Museo d'Art Contemporani de Barcelona, 1996.
Plant, S. The Most Radical Gesture: The Situationist International in a Postmodern Age, London, Routledge, 1992.

Inspirations: Gillian Wearing
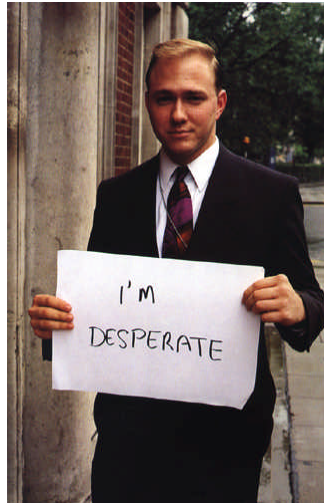
In her project, 'Signs that say what you want them to say, and not Signs that say what someone else wants you to say,' Gillian Wearing asked people in public places to be photographed holding signs on which they had written their thoughts. The results are surprising, rich, and sometimes poignant.

We were inspired by this work to think that we might get similarly intimate responses from the Probes, if we could use them to create a playful and unconstrained opportunity for communication.

READING
Wearing, Gillian. *Signs that say what you want them to say, and not Signs that say what someone else wants you to say.* London: Maureen Paley Interim Art, 1997.

Inspirations: Sophie Calle

Projects by the French artist Sophie Calle also inspired the Probes. Several of her projects involve investigating other people in ways which have effects on herself.

For instance, she followed a stranger to Venice after meeting him briefly and hearing him talk of visiting the city with his girlfriend. Her account of waiting to find the couple and then surreptitiously following them reveals her growing obsession and the emotional toll it takes as much as the photographs reveals about the couple.

In another project, suggested by the author Paul Auster, she 'adopted' a New York phone booth, keeping it decorated and stocked with refreshments and useful items for a period of about a week (until it was 'shut down' by the phone company). Again, the project concerns the psychological effects this relationship has on her as much as it concerns the effects of the 'domestic phone box' on urban passers-by.

READING
Calle, Sophie. *Double game*. London: Violette Limited, 1999.

Aspects of the probes

Using many items allows people to choose their responses.

Casual items reduce 'official' expectations.

A playful aesthetics conveys designer's personalities.

Absurd and confusing tasks ensure unexpected results.

In sum, the Cultural Probes come from an approach that highlights the subjectivity of people - both designers and eventual users - over 'objective' information about them.

A number of features of the Probes helped to achieve this end:

The use of many diverse items creates a space in which participants can shape their responses to reflect their interests. The open-ended, informal nature of the materials helped to reduce expectations about what might count as an appropriate response, freeing participants to reveal aspects of their lives that they might not reveal through more 'official' materials. The playfulness of the materials and their semi-professional aesthetics both spoke to our commitment as researchers and revealed our design directions. Finally, the inclusion of very open-ended, confusing, and even absurd tasks helped to thwart the tendency for research to reveal only the expected.

This last may be the most important point. Beyond the playfulness and the pleasure we tried to create with the Probes, we were concerned with subverting 'normal' research to avoid falling into expectable paths. By creating a situation that was uncontrolled and difficult to understand or analyse, we forced our participants and - especially - ourselves to continually reexamine and rethink the context for design.