

Making Design Probes Work

Jayne Wallace¹, John McCarthy², Peter C. Wright³, Patrick Olivier³

¹School of Design
Northumbria University
Newcastle upon Tyne, UK
jayne.wallace@northumbria.ac.uk

²Applied Psychology
University College Cork
Cork, Ireland
john.mccarthy@ucc.ie

³Culture Lab
School of Computing Science
Newcastle University, UK
p.c.wright/patrick.olivier@ncl.ac.uk

ABSTRACT

Probes have been adopted with great enthusiasm in both Design and HCI. The heterogeneity with which they have been used in practice reflects how the method has proved elusive for many. Originators and commentators of probes have discussed misinterpretations of the method, highlighting the lack of accounts that describe in detail the design of probes and their use with participants. This paper discusses our particular use of *Design Probes* as directed craft objects that are both tools for design and tools for exploration across a number of projects, spanning a decade, centered on self-identity and personal significance. In offering an example of what a framework for probe design and use might look like, we attempt to address the identified lacuna, providing a synthetic account of probe design and use over an extended period and conceptualizing the relationship between the properties of probes and their use in design projects.

Author Keywords

Design; Probes; Craft; Interaction Design; Materiality; Empathy; Reciprocity; Trust; Investment.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design

INTRODUCTION

Probes have become a phenomenon within HCI research. Since their creation in 1999 [2] their adoption has become wide in both scope and divergence. In Boehner et al's [1] review of probe use the count was 90 papers cited in the ACM guide to computing literature. The alacrity and enthusiasm with which probes have been adopted in HCI shows that the community saw something new and desirous not only in the method, but also in how it had been used by its originators and the outcomes to which it had led. What is also apparent is that the method has often proved elusive as well as incongruent to other methods used in HCI. In consequence, as Gaver et al [4] and Boehner et al [1]

discuss, probes have often been misunderstood and misappropriated. The results of misinterpretations have in many ways served to muddy the waters further regarding what probes are and how they can be used.

Boehner et al highlight that it is often the case that accounts of probe-use gloss over both the design decisions taken in making probes as well as the detailed use of them. In practice the use of probes has been heterogeneous and both the forms and processes of designing them have reflected this. This is problematic for the research community as it encourages further misappropriation and there are not many accounts or frameworks detailing how probes are designed or used.

We consider the use of *Design Probes* as tools for design and understanding. As such, design probes are objects that are usually small in scale, whose materiality and form are designed to relate specifically to a particular question and context, posing a question through gentle, provocative, creative means offering a participant intriguing ways to consider a question and form a response through the act of completing the probe creatively (Figures 1-9). We regard probes as directed craft objects used in empathic engagements with individuals around issues centered on self-identity and personal significance. Unlike previous accounts that tend to describe one-off uses of probes in a particular design activity by contrast, we reflect on a decade's experience of using probes. We outline properties of our probe design and utilization and give a conceptual and pragmatic framework for qualities of probes and their use in engagement with participants. In doing so we recognize that our approach to designing and using probes is only one of potentially a number of alternatives. Our point is not to prescribe a single probe 'methodology', but rather to illustrate what a framework for probe design and use might look like, and in so doing, to provide interested researchers with support for appropriating probes in interesting ways. Thus our contributions in this paper include: addressing the lacuna identified by Boehner concerning the design of probes and the details of their use as designed artifacts; providing a synthetic account of probe design and use over an extended period; and conceptualizing the relationship between the properties of probes and their use in design projects.

With respect to that final contribution, we detail the design properties of thematic openness and boundedness that give

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2013, April 27–May 2, 2013, Paris, France.

Copyright © 2013 ACM 978-1-4503-1899-0/13/04...\$15.00.

a participant space for reflection alongside boundaries that bring clarity and a sense of completeness (see Figure 1 for example). The pace of probes is discussed in relation to how different dynamics can be created to facilitate ice breaking in the process or forms of deep reflection (see Figures 4 & 7). We unpick the ways in which materiality can be used to echo a question through innovative forms (see Figure 2), offering a variety of ‘ways in’ to a particular issue and tangible means to express and represent a response. Our position is that by attending to these elements and dynamics of probes through design it is possible to fully articulate the method; where probes are purposefully designed, inventive and engaging scaffolds for response even in difficult contexts. We further reflect on the use of probes in engagements with participants, in order to reveal how investment leads to a relationship of trust that enables exploration of challenging aspects of experience, and how the reciprocity of the probe method creates a particularly rich, reflective form of communication.

DESIGN AT THE HEART OF THE METHOD

Gaver et al’s [2] initial Cultural Probes were born from the pragmatic motivator of researchers in the Presence Project [3] not being able to be with their research participants in person as often as they would have liked, as participants spanned several European countries. The deeper motivation however was to develop a new approach to engaging with the complex and multi-layered realities of experience. Gaver [2, 3] drew on the creative processes of the Situationists, Dadaists and Surrealists appropriating the subversive, playful and at times unsettling nature of processes originating in these art movements to open up a fluid dialogue with participants brokered by objects that explored lived experience at its fullest. As Gaver puts it [2] “...we tried to use, judiciously, tactics of ambiguity, absurdity, and mystery throughout, as a way of provoking new perspectives on everyday life” [p.26].

Probes were designed objects, designed to ask questions and present challenges in an open-ended, often provocative manner, involving a varied set of activities that participants would become involved with and respond to. Gaver et al were able to engage with participants remotely, but more importantly, through the probes they were able to extend themselves into their participants’ lives and entice participants into their design process. Probes were curious objects that led in turn to the sharing of unobvious, idiosyncratic and real aspects of the participants’ lives and personalities. The probes thus attended to the detail of experience and of individuality.

Notably at a meta-level Gaver [3] saw probes having a wider purpose: “to disrupt expectations about user research and allow new possibilities to emerge” [p.23]. Probes as Boehner [1] discusses were intended to “subvert or undermine, rather than supplement, traditional HCI methods” [p.1080] and importantly design was at the heart of this new approach.

Ideologically, approaches to design in HCI in the 1990s were creating an imbalance in the designer-user relationship. Wright et al [17] discuss how until the early 1990s the idea of design in HCI was taken for granted, and was neither a point of concern nor discussion “Design meant the process of modeling users and systems and specifying system behavior such that it fitted the users’ tasks, was efficient, easy to use and easy to learn. In short, design in HCI was about engineering usability.” [p.1]. Whilst sections of the HCI community have developed radically from this positioning, as Boehner [1] and Gaver [4] articulate, Probe methods continue to jar with deep-seated considerations of design in HCI. There are examples of probes being used in the Situationist spirit that Gaver described [10] and others emphasizing the use of probes for inspiration foregrounding design sensibilities [6], but although designers such as Mattelmäki [8, 8] and Leitner [5] have emphasized the value and need for design within the Probe method it has nonetheless become something of an umbrella term in HCI under which a wide selection of objects have been ascribed and where design has become somewhat out of focus. Off-the-shelf stationery has become commonplace in Probe kits, for example, lending a veneer of the method without the substance that comes from an engagement through design with the materiality, form and character of Probe artifacts. We unpick our own use of the method over the last decade in fine-grained detail to illustrate the potentials of keeping design at the heart of the method and to refocus attention on what it means to design probes and what the method can afford.

Design Probes for empathetic engagement

Our notion and use of a design probe is to work with individuals to engage deeply with the participant and enquire around her sense of what is personally meaningful. From the experiences and meanings shared with us by a participant we attempt to make digital artifacts that echo fragments of these meanings back to the specific participant. Our research includes the development of digital objects that spur and support reflection, digital jewellery that bears witness to or supports relationships between individuals and artifacts developed through research into the maintenance of a sense of self and relationships to support personhood in dementia.

In working so closely with individuals and making digital artifacts specifically for them, our use of probes is somewhat atypical from the usual group scenario, where probes are used to gain understandings and inspiration to inform designs around a particular theme or issue [8], or from examples of Gaver’s practice [4], where individuals respond to probes but where the resulting design ideas are given to different families or individuals to live with. In our practice, probes are part of an intimate relationship and design process that remains with particular individuals throughout. We make a bespoke set of probes for each context or project and a participant lives with these for a

number of weeks. The insights we discuss in this paper concerning participant experiences to probes stem primarily from revisiting what participants had done physically to probe objects in responding to them and secondly from revisiting transcripts of discussions around probes from design field studies of projects over the last ten years.

We subscribe to the ethos of Gaver's probes, respecting them for their ability to inspire and "to stimulate our imaginations rather than define a set of problems." [2 p.25] We also agree with his reflections [4] that many in HCI have missed the point of probes, rationalizing them to "produce comprehensible results...[and] even use them to produce requirements analyses" [p.1] We differ from Gaver in that our probes are more deliberately and specifically pointed towards the phenomena we wish to address. Equally our experience differs somewhat from Mattelmäki's descriptions of design probes [8] where "users collect and document the material... [and] Probes are a collection of assignments through which or inspired by which the users can record their experiences as well as express their thoughts and ideas" [p. 40]. In exploring personal significance and identity, at times in extreme contexts such as dementia, we have found that users may struggle to articulate feelings around challenging aspects of their lives and it is not straightforward for them to document these things. Probes need to work hard to facilitate a participant's reflections, deploying a range of multi-angled methods. We see them as objects that enable deep reflection and gentle ways to give a participant access to complex notions and experience. This is important, as a central factor in the probe process is the development of a relationship of trust with participants.

In that we design probes that are purposefully directed towards the phenomenon we are addressing, the ideas for our probe designs are not random; they are forms of tentative hypotheses towards empathic understanding and also future design ideas that are informed by aspects of a particular context that we have hunches about. For example, in recent projects where we have been working with people with dementia [13, 14] (see Figures 1, 2 7 & 9) we have immersed ourselves in the clinical and social aspects of the disease as much as has been possible (volunteer work with Alzheimer's Society day care centers, artist placement with clinicians and philosophers of dementia care, time spent with creative dementia groups, reading texts relating to clinical, social and relational aspects of dementia) and have sought to gain an understanding and empathy for different aspects of how life and self are affected. We create probes that are laden with a particular theory or insight, gained firsthand, and explore specific aspects of this. Consequently probes are evocative of certain issues or what we imagine to be pertinent in a certain context. A set of probes is purposefully structured to relate to a range of such issues. To give an example of what we mean within the *Personhood* project, the term "personhood" speaks to a notion of the self as something socially maintained,

nurtured and constructed at least in part. The role of human relationships in supporting identity for someone with dementia is therefore highly significant. Many of the probes we designed within this project related purposefully to various distinct aspects of these meaningful relationships with other people, self-worth, home, and presentation of the self to others. Without explicitly doing so, each of the probes in the set related to different facets of what we thought might be significant, as informed by theory and our own experiences of dementia.

We use probes as both tools for design and tools for exploration. In the following sections we open up in more detail how we design probes, the roles they take for us in our approach and how we initiate probes with participants. We do this by firstly discussing them as scaffolds for response, which we relate to openness, boundedness, materiality, pace and challenge. Secondly we describe the probe method in terms of a relationship with a participant, the dynamics of which relate to trust and investment as well as reciprocity and communication. Each of these ideas teases out something critical about what the probe process is in terms of design, and underpins the way that we frame and use probes throughout the various stages of our research process.

Scaffolds for response – Designing Probes

It is easy to see that the probe process involves shared making, in that participants complete a probe that was initially made or started by the researcher. But it is less obvious, although we would argue more significant, that the probe process can achieve a form of *co-creativity*. This necessitates more than completion of a probe; it requires a participant to act creatively and invest in the process in order to create a final probe that is an artifact rich in meaning, made whole and unique through the participant's reflections and actions (see Figures 1, 2 & 3). This notion puts emphasis on craft and the completed object, which may be different from a provocative probe object which may focus more on unsettling a participant and encouraging them to think laterally and playfully around a particular issue.

Being creative is not an easy or natural activity for all. One of the first things that most participants say on embarking on a project with us is that they are not creative people. It is not enough to hand over objects to participants and presume that they will respond creatively to them. The design of a probe must involve more than the formation of a question in a three-dimensional form; it must also involve the design of scaffolds for creativity and response. Probes are not an arbitrary set of objects; their materiality is crucial to both framing a question in a particular way and creating a structure that facilitates a participant's creative ability and response.

Form and aesthetic are critical in many senses. Probe design is about the physicality of the probe object, sensitively

echoing the question being asked in innovative ways that open up many different channels for creative response and reflection. In this we consider, for example, the feel of the object, how the aesthetics reflect the way we are asking someone to respond, the pace of the probe artifact, the space we are giving someone to reflect within, the era the object feels like it belongs to and the ways that the participant will be able to add their own aesthetic. Such parameters give us scope to share something of ourselves, enable us to bring out specific nuances of a question and facilitate a participant in responding. Through considering probe design in terms of boundedness, materiality and pace, we can explore how the dynamics of probe design function in our experience.

Openness and Boundedness

The openness of our probes is thematic: each probe is made with a theme in mind that is quite specific in some ways. We try to give participants ways of thinking about a theme that they have not experienced before, and in this is the gentle challenge to enter into the probe activity. Here the creativity lies in the challenge to do something new.

Probes are part-made objects explicitly awaiting closure, which offer a participant both openness to share whatever she feels appropriate and clear boundaries to respond within. The significance of both boundaries and a sense of boundedness is that they enable clarity of what the activity to complete a probe needs to be, give a participant the sense that a probe is completable and thus provide an unambiguous context and safe space within which to be creative. The boundedness of a probe balances out the multitude of possibilities facing a participant. It acts like a form of safety net that confirms to the participant how much to do, sets confines within which to be expressive and makes creativity a less fearsome endeavor.

Self Tree probe (Figure 1) allows us to look at these dynamics in more detail.



Figure 1. *Self Tree* probe detailing the group of objects, details of individual elements and examples of participants' responses.

This probe is made up of a series of oval discs, locket-like in appearance, attached to the branch of a tree. All but one of the discs has paper covering the front, with the word "Name" printed and a small concertina of folded paper on the reverse. The remaining disc is slightly larger than the others and has the silhouette of a woman printed on the front (representing our main participant) with the following instructions on the reverse:

"Please use these objects to tell me about some of the people who make you who you are (family, friends, even people who you've never met, but who have had a real influence on you)."

Self Tree probe is from a set made within the *Personhood* project exploring aspects of self and personhood in dementia. We worked with Gillian, a person with mild stage dementia (at that time) and her husband John.

Gillian and John chose to use the probe to tell us about people who have been close to Gillian: some alive, some dead, some related, some friends. They gave the name of each person on the front of the disc along with a title describing their connection to Gillian (for example daughter, friend) and the person's age. They used the paper on the reverse to give very poignant narrative descriptions of the relationship between Gillian and each individual, where anecdotes and experiences were shared including how each particular relationship had changed over time. On the final section of paper they wrote a quote from each person about their feelings for Gillian. Where possible these quotes were obtained from the individual specifically for the probe and where not possible a quote that Gillian could remember them saying was used.

Gillian and John understood the parameters of the probe; it was the first of the set that they gravitated towards and they found the limitations of paper size to be a positive factor:

"it was, not too big, you hadn't much to write on it. So you had to be quite, selective in what was put on. And I I just thought that was fantastic. (...) I mean compared to you know, if you'd given us a book to write in, well immediately you think I don't have to fill this, you know, but that was so precise that I think that's it's great strength, it worked for us."

The boundedness created by the physicality of the oval forms and the limitations of scale of the paper forced Gillian and John to analyze what the essential aspects of each of these relationships was in order to convey the essence of each in such a focused manner. They were able to get to the heart of what they wanted to say and, once completed, each disc shared a crystallized account of seven rich and meaningful relationships. Within the confines and boundaries of the probe they made it all their own, they were creative and did things with it that we had not prescribed or suggested. They brought in voices of the other people through quotes, posed descriptions of relationships like small stories replete with moral guidance and life lessons learned, and reflected on the changes in these relationships because of dementia.

The physical scale and boundedness of the probe was highly significant in making it feel completable, in suggesting the focused quality for the response, and in making participants feel that they were able to co-create on a level with us. If the *Self Tree* probe had been presented without such focused boundaries (for example, as a blank notebook as John mentioned) there would have been ambiguity surrounding how many people to talk about, how much to say and what kind of dynamic to create through the response. How would a participant know when she had finished? Would the probe be complete only when every page had been filled?

Probes are intentionally designed to be partially complete to create the sense in the participant that to complete a probe feels like finishing something, it is important for a participant to feel that they have done enough, that they have contributed something worthwhile. The expanse and lack of direction of a blank notebook could therefore bring pressure to the response process, create ambiguity around ‘how much is enough?’ suggest a lack of direction in these matters on the part of the researcher and potentially stymie a participant.

Materiality

Self Tree probe suggested a preciousness that Gillian and John responded to by intimately detailing highly personal experience. More than the boundedness of the probe, this dynamic relates strongly to the aesthetics and physicality of the forms. *Self Tree* was a physical metaphor of what it enquired around: it embodied the context of the question. The discs were locket-like in aesthetic through their oval shape, scale, use of a silhouette of a woman and the concealed space for personal information. Their connection to a tree branch suggested an organic interconnection between the discs in some sense, a “family” of objects. Each of these qualities combined to create a group of objects that suggested a kind of familial and relational preciousness. *Self Tree* placed the participant at the heart of a nexus of rich relationships and as something vital to other people. She could see herself as someone valued, nurtured and supported within this web.

The jewellery-like physicality of the probe related the process to other forms of ‘reflection through objects’ that we have all experienced: reflection through mementos and souvenirs that draw us back to past experiences and events. Objects like these have always acted as sites and tools for reflection for people. Probes act in similar ways, whether literally as in *Self Tree* or more ambiguously in the case of probes generally. Probes explicitly ask people to use them to reminisce, project and reflect; the object asks to be used as a locus or home for feelings and remembrances. *Self Tree* was challenging as it asked Gillian, a person with dementia, to reflect on her meaningful relationships with people through her life and how they had contributed to the woman she had become. In the context of life with dementia, where change and notions of loss are a constant

backdrop, we were exploring sensitive territory with this probe. However, by designing objects that caringly embodied the question, the forms that the probe took provided gentle ways to do this. They gave Gillian comprehensible structures to explore within, which lent themselves to the subtle, organic contexts that these aspects of self relate to.

The importance of tangibility is not just that the probes can be evocative objects to reflect through, but that the material properties of the probe can structure the reflection itself. If we take two examples, *Home* and *Pillow*, we can explore this point.

The *Home* probe (Figure 2), again designed within the *Personhood* project, is a small (approx 16 x 12 x 15cm), hollow, wooden model of a house with a flag reading “Please use this object to tell me about what home means to you personally (for instance what are home-like feelings, places, aesthetics, words and objects?) Feel free to draw on/inside the object, stick things onto it or change it in any way you see fit.”

Participants Gillian and John involved their two adult children in their response. They made the probe something their own, not only in the content, but in the way that they used the object physically. They reflected on what home meant to them in relation to the harsh changes to their lives through Gillian’s dementia by describing home before and after Gillian’s diagnosis.

The structure and form of the probe was, obviously, house-like and the participants reflected this in the way that they interpreted it and changed it physically; areas were compartmentalized, the house was ‘decorated’ and the roof was ‘tiled’. The structure of the form lent itself to being interpreted in this manner and the completed probe actually looked *lived-in* as a result.



Figure 2. *Home* probe with illustrations of responses.

The heads of the family took the largest sides, whilst the children were allocated the smaller ones. Photographs of each person, titled ‘then’ and ‘now’ decorated their side of the object and speech bubbles were used to denote that the written words were their individual voice and opinion. The

roof, being split into two and connecting all of the other sides, was selected by the participants to represent the family as a group. It was used to share both abstract concepts of what home means to them (words stuck as multi-colored roof tiles) and something very individual and idiosyncratic (a photograph depicting a family mealtime ritual from when the children were growing up).

The scale of the probe meant that there was a good amount of space on each side for content to be added, but it did not demand a vast amount of content in order to cover all of its surfaces and for the probe to be seen to be complete. It was a strong structure but not heavy, so it could be easily held and manipulated. It was a simple form evocative of a house, but not related to any particular style or suggestive of any particular taste and as such functioned as the symbol of a house, of home. The surfaces were smooth enough to write on and porous enough to take glue easily. These points in the design of probes are important scaffolds to encourage a participant to add to and build on what has been started or laid as a foundation.

The *Pillow* probe (Figure 3) was created to explore issues of personal meaningfulness within a digital jewellery project. It is approximately 9 x 7cm and is made from white cotton with padding like a small pillow. Part of the fabric of the pillow can be folded out from the main body, then tucked away inside the pillow again. The probe asks a participant to keep the pillow with them and to use it to share a dream (which could be a dream from sleep, a daydream, a fantasy or aspiration) by writing on the fold out of fabric and hiding it away again within the main body of the pillow.



Figure 3. *Pillow* probe an example of a completed response.

This probe is evocative of the intimacy of laying your head upon a pillow: the aesthetics are soft and the scale is small and intimate. Each of these physical attributes suggests that this probe could be something to engage with on an intimate level. There are further suggestions of intimacy in the action of writing something and then hiding it away, like the sharing of a secret. The gentleness of the object and the physicality of the action of hiding the shared information both act to suggest that a dream shared by a participant will be safeguarded and handled sensitively. Similarly, the gentleness of the form was an intentional aesthetic designed to be able to carry such a personal and searching question.

The invitation to write on the fabric could be seen as a big commitment. A participant knows that once she is writing on the fabric the words cannot be rethought or removed. In both the uncommonness of writing on fabric and in that the

writing will actually become part of the aesthetics of the object, there is an elevation from writing a response on pieces of paper. Further writing on an artifact is something that we are usually dissuaded from doing and is often thought of as defiling an object. In *Pillow* probe, part of the creative act is a nudging of what someone feels comfortable doing. To scaffold this activity we wanted to give permission to write on the object by starting this process off ourselves in the way we presented the instructions.

We could have embroidered the request to share a dream on the pillow or made a washing label with the instructions sewn into the seam, but we are also always aware of not making a probe feel too finished and potentially alienable. There is a balance to be struck between making the probes too polished (done in an attempt to show a participant your commitment and understanding of a situation, but actually creating objects that seem too well made for a participant to feel she can meet these standards in her own additions) and making probes that leave realistic spaces for completion.

The relative small scale of probes is important because it helps them to remain approachable and manageable. The tangibility of probes means there is something to hold, to touch and to add to in a physical way. When a question is challenging, the physicality of probes becomes a facilitating factor. The tangibility of probes means that there is something for a participant to focus on. People share ephemeral entities such as their feelings or aspirations and the physicality of the probes enables us to tie these abstract notions to something solid. The dialogue becomes embedded in and mediated by objects in a very concrete sense and these objects become things that we communicate with and through. From the first exchange of probes with a participant, the communication is not only through the responses and questions posed, but also through form and aesthetic.

Our approach to the design of probes is embedded in craft practice, which we describe as an intimate and empathic process that fuses learned knowledge of making with the desire to create objects *for people* [11, 12, 15 & 16]. The human is very present in craft objects, both in the *trace* of the maker in the objects and in the humanizing of various processes and materials, and this holds true in our notion of probe design. A craft approach to the development of probes incorporates an empathic engagement with the theme being explored through each probe in order to concretize and echo sensitive aspects of the theme in physical form.

Pace and Challenge

Probes live with people. They are given to participants for a period of time (usually weeks) during which they inhabit their homes and personal spaces. The probes silently ask questions during this time and the atmosphere around answering them (in our use of the method) is in general an unhurried one. This slowness to the process means that a participant can set her own pace and there is time to reflect,

to hold a question in the back of the mind before responding, and further to use her initial response as a reflexive tool. Even if a participant responds to the probes in the last days and hours before returning them the questions have been with her for the duration and even whilst residing in the background have been under consideration by the participant over time.

Within this general pace of the method we find that by creating probes that have a variety of individual paces we can design objects that not only ask a selection of distinct questions, but also act as tools that enable a participant within the various and often challenging acts of response themselves across the probe group.



Figure 4. Pot of Clay probe with an example of a response.

The faster, lighter weight probes serve as icebreakers in the process. *Pot of Clay* probe (Figure 4) which asked a participant to make an indentation in the clay of something precious, or *Body Mapping* probe (Figure 5) with which a participant attached stickers to areas of the body to show where she wears jewellery at different times and for different purposes were both designed with a faster pace in mind.



Figure 5. Bodymapping probe with an example of a response.

They involve lighter questions and direct, simple, physical acts of response. Such probes can become breathing spaces, offering relief from probes that are proving challenging, and, significantly, they can act as catalysts, the completion of which may trigger further responses to more challenging probes.

Probes that are designed to have fast, lightweight activities and questions often only garner a certain level of intensity and meaning in response, and in many cases the brevity and triviality is not appropriate for certain contexts of question. Some questions or subject matters are difficult to express answers to and we can see how probes that offer space for deeper reflection are needed. When it is hard to get a handle on how you feel about something, it is useful to be able to explore this through a selection of means. As such, a participant may use a few probes to tease out for herself different aspects of what she feels.

Probes that in themselves offer a series of multiple units can be used in distinct stages by a participant, so the difficult or challenging question being posed can be attended to through a series of small steps, breaking it down into something manageable. *Top Trumps* and *Preserves* probes were designed with this in mind.

Top Trumps probe (Figure 6) gave a participant six cards on which to describe objects that were powerful to her; participants could describe the object, draw or glue a photograph onto a window in each card and rate the powers of the object in numerical values out of 100.



Figure 6. Top Trumps probe with examples of responses.

Preserves probe (Figure 7) comprised three small jars with the question: *If you could capture anything (for instance any moment, sound, song, smell, view, object, place...) and preserve it in this jar for you to relive what would you choose?* The label could be used to describe the choice (through writing or drawing on it) and/or something could be placed inside the jar to represent their choice.



Figure 7. Preserves probe with examples of responses.

In their compartmental structure both probes afford a participant the function of segmenting each probe and completing sections over time. This quality can make even a more searching probe feel *completable*; the question being asked may require much searching, but through segmentation the probe doesn't feel over awing and the slow pace of the process helps support this. *Preserves* probe, similarly to *Self Tree*, sets a further slowness of pace in that it enquires around the participant's whole life. This necessitates a certain kind of reflection on the part of a participant relating to their personal biography. We have used metaphors and imagined contexts often in our practice with probes to give participants ways to externalize difficult notions. *Communication Fairytale* and *Self Seeding* probes are useful examples for this discussion.



Figure 8. Communication Fairytale probe with example pages.

Communication Fairytale (Figure 8) was a short storybook. The participant, as the central character, was separated from ‘loved’, a character that the participant relates to someone in her own life. She is then taken through the story and asked to complete sections in the book. Questions range from how a participant felt connected to ‘loved’ when not with him/her physically, what a good memory of her and ‘loved’ looked like, what kinds of human communication or modes of technological communication she found precious and if anything were possible, how she would like to communicate with ‘loved’.

Self Seeding probe (Figure 9) was a seed packet containing a small number of plant labels.



Figure 9. *Self Seeding* probe with examples of responses.

A participant was asked to imagine that she could turn some of her personal qualities or idiosyncrasies into seeds. She is then asked to consider which these would be, where she would plant them and what they would blossom into.

Both probes explore aspects of who the participant is. *Self Seeding* asked a participant to look within herself, enquiring around aspects of her nature and how in turn these qualities extended out into the world to have an impact; to ‘blossom’ or ‘grow’. As a physical metaphor of what it enquired about, *Self Seeding* invoked the context of seeds being planted, which brings with it ideas of something becoming bigger than itself and of something small like a seed holding so much potential that it has the capacity to extend itself and flourish. It asked a participant to imagine the self continuing over time, and consider what it was about herself that she valued and could see having value for other people. The seeds and seed packet gave us a very useful vehicle to enquire around these complex notions. It provided a recognizable symbol for these things, a simple action through which to convey these complex meanings (writing descriptions of personal qualities and what they would develop into on seed labels) and a simple form into which meaning could be poured. It gave a way to externalize complex aspects of identity, personality, self worth and relationships with things external to self. The process of working with probes can tease out meanings that are seldom explicitly considered, whether through considering a subject in new ways or through expressing meanings in a tangible form. Similarly, *Communication Fairytale* enabled a participant to externalize complex notions through the non-real world context of a fairytale story. Through this medium we were able to create imaginary scenarios and ask the participant to consider situations unencumbered by restraints of what is possible. The freedom afforded us by presenting questions in a

fairytale enables us to sidestep to a degree existing realities and inhibitions. A completed probe can become a reflexive tool that may act to actually show a participant how she feels about something; often externalizing a feeling can bring clarity and a new way of seeing something.

Both *Communication Fairytale* and *Self Seeding* were meant to get participants to think in a broad or lateral way and probes such as these will by association invigorate a probe set with this flexibility and breadth of context. The experiences and feelings that we were asking someone to express may be complex and multi-layered. The heterogeneous nature of probes acts here to offer different ways for a participant to get at what they want to say.

It has been common for participants whom we have worked with to show probes, completed or empty, to other people and discuss their thoughts prior to responding in full. Design probes that are thought provoking, searching and unusual mean that people often want to puzzle through their response and to take time when engaging with them. Conversations that facilitate fresh ways of thinking through a response can happen around them over time. Someone can patiently respond and complete probes piece by piece as the best way for them to respond becomes clear to them.

Thematic openness, boundedness and pace, along with the varied facets of physicality we have discussed, are dynamics of the structural and material properties of probes that can be utilized as scaffolds for creativity and response. They are properties that probes can be imbued with that enable people to engage with them. All of these qualities and scaffolds enable participants to make links across probes, where responses can connect probes together or span a series of them. They are significant components in the process that play a part in how and how far, a participant involves herself in the process.

Relationships and reciprocity – Initiating probes

When done well, probe sets show a participant that a researcher has thought hard about the nature of the enquiry, has designed a set of poignant ways to think about different aspects of the topic, has invested herself in this process and has created a unique environment through which to have a dialogue together. The relationship between researcher and participant is central to the method.

Our first step of the process is to meet with a potential participant to introduce our particular research focus, our methods and ourselves, as a prerequisite to her becoming involved in a project. This initial meeting, although brief, gives us our first insight into the lives of participants and helps us to gain some empathy with them. For us, a sense of investment begins through immersing ourselves in the particular theme of study. This deepens through the creation of probes that attend to different levels of a subject. We design bespoke probes for each project. Some probes (such as disposable cameras) do work in several different themes, but we tailor these tightly to each particular context. We

attempt to create a process that is rich and interesting enough that participants will want to enter into it with us and feel that they get something positive out of the process.

Investment and Trust

Gaver [2] pre-empted potential misunderstandings of the method in 1999, suggesting that a generic approach to the production of probe materials would seem “insincere, like official forms with a veneer of marketing” [p.29]. To genuinely understand and use the method, you have to get involved and invest in the process. The method has a very personal aspect to it depending on several things: gaining empathy with your participants’ particular situations and environments, the bespoke designing of probes for this particular context and sharing yourself in the process.

In that probes are made in part by each party, there is a sense of shared creation. Probes become a common ground as the process becomes a way of building a relationship in a more democratic manner than the roles of researcher and participant often afford. The level of care that is put into the conceptual and design aspects is palpable and as such evident to a participant communicating the level of investment and respect. Personal engagement around aspects of a participant’s life experiences *requires* a relationship of trust to develop and results in the knowledge that what is disclosed will be valued and respected. Reflections can be made together on both poignant (or painful) aspects of experience as well as more enjoyable elements. Probes offer us the means to open up a process of enquiry that is gentle, multi-angled and reciprocal.

Reciprocity and Communication

The probe process is one of bi-directional reciprocity. For this process to really work there needs to be an investment from both researcher and participant. More than a symmetrical activity, the process foregrounds giving and there is a sense of something positive happening here: both parties want to give and invest something of themselves in the endeavor. This aspect of the process is borne out in Gaver et al’s [2] descriptions of how participants from the Presence project sent them things above and beyond the tasks asked of them, even greetings cards and messages of goodwill. This kind of investment from both parties is critical to the success of the method.

At first, giving something to someone whom you do not yet know very well is a tentative act. In this context the notion of making a collection of probes is important; we are able to make a set of small artifacts that enable us to give a series of different aesthetics and kinds of objects to test the water and see what fits for the person we are making them for. We can create heterogeneous elements and ensure a good coverage of different activities, media and means to respond. Giving multiple probes helps counter the uncertainty on our part as to which will have poignancy for someone, and means that participants can gravitate towards the probes that they feel they can respond well through

whilst still feeling that they have taken part in the exchange sufficiently. Importantly, a participant is free to respond to as many or as few probes as she wants. We give her the power to reject ones that do not feel right for her. How a participant responds is therefore also a form of editing the probe series and a creative act in itself.

Through reciprocity comes conversation. There are reciprocal gestures, acts of sharing and getting to know one another and an informal nature to the process both within our human interactions and in the participant’s interactions with the probes. For us this sense of the conversation is critical; we are not just asking someone a question and gaining an answer, we are asking someone to reflect, share, surprise and reveal things to us in a cycle of atypical gestures. Within this simple premise are rich layers.

Douglas, in summarizing a central insight offered by Mauss’ classic *The Gift* [9] suggests, “A gift that does nothing to enhance solidarity is a contradiction” [Foreword]. In other words, gifts are about the sharing of and sharing in something and, although different from gifts in the traditional sense, probes evoke the notion of giving from both researcher and participant points of view. There is a natural reciprocity to gift giving and undeniably a sense that a giver hopes that her gesture will be reciprocated, but, as Douglas and Mauss argue, this is less to do with pure obligation and more to do with a desire for cohesion between givers. A gift is more than the sum of its parts; it is a representation of how the giver views and understands the recipient, in terms of values and sense of self and how the giver regards the recipient in relation to herself. The reciprocal probes process then is in part a delicate dance where each person shares her own personal values, as well as an understanding of or empathy with those of the other person. Probes, when considered in this context, are far more complex and delicate a method than is often assumed.

It is highly important to us that a participant finds some personal benefit from the process. For us it is not a data gathering exercise; it is a reflective and reflexive process. Empathy is a key element and we work hard to be open as designers to absorbing what a participant tells us about her experiences and to attempt to step into her shoes as far as possible. Probes are enormously valuable tools in gaining empathy as they have the depth and richness to tackle difficult issues from a range of angles and enable engagements with someone around intimate aspects of experience. The cyclical aspect of the method sets probes apart from many research tools and makes their use and value so significant. To be a participant in the probe process is to build up a set of objects, responses and meanings, all from and about yourself. For the participant, the series of completed probes is in a way like a small autobiographical exhibition and offers ways to see her responses and meanings afresh, presented in concrete, tangible forms and in relation to all of the others she has co-created. This dynamic and cyclical process itself begs a participant’s

attention, re-examination and reflection of what has been shared. As tools for self-reflection, probes have clear and valuable properties. Probe object and action have the means to reveal to a participant something new about her own experiences.

CONCLUSION

Our use of design probes is as embodied questions that exist in a co-creative, empathic and shared context between a participant and a design researcher. Design probes mediate both the relationship between participant and researcher and participant and her own feelings in relation to a question. This process provides more than inspirations for design; it embodies design to enable shared understandings in relation to challenging, intimate and real aspects of lived experience, which enrich the design process through layers of meaning.

We assert that only by keeping design at the heart of probes that the value of the method can be maximized. We have attempted to address the void identified by Boehner, concerning the design of probes and the details of their use, by providing a reflective account of our own approach to probe design and participants' responses to them. Our account describes how the properties of thematic openness and boundedness provide space for reflection; the role of completability; how considerations of pace can enable ice-breaking as well as deep reflection; and also how working with the materiality of a probe can enable questions to be posed in innovative and sensitive ways. In these respects we have sought to offer both a framework for probe design and use, and an initial lexicon of probe qualities.

The original functioning of probes was to go out into the world to capture something of people's lives acting as rich inspiration for designers. Probes were somewhat disembodied, fascinating snapshots of experience and meaning that gave talented designers the stimulus and openness to design in response. This ties in somewhat with how designers tend to work generally making things for a 'person' or 'persons' rather than for someone who they get to know more deeply. We have sought to detail an alternative way of approaching probes that subscribes to Gaver's probes in ethos, but enmeshes the participant and researcher throughout in a multi-layered process of expressing and finding meanings.

ACKNOWLEDGEMENTS

This research was part funded within the SIDE (Social Inclusion through the Digital Economy) RCUK Digital Economy Research Hub.

REFERENCES

1. Boehner, K., Vertesi, J., Sengers, P., and Dourish, P. How HCI interprets the probes. In *Proc. CHI 2007*. ACM Press (2007), 1077-1086.
2. Gaver, W., Dunne, T., and Pacenti, E. Cultural probes. *Interactions* 6, 1 (1999), 21-29.
3. Gaver, W., Hooker, B., & Dunne, A. *The Presence Project* RCA CRD Projects series RCA Research Publications, 2001.
4. Gaver, W., Boucher, A., Pennington, S., and Walker, B. Cultural probes and the value of uncertainty. *Interactions* 11, 5 (2004), 53-56.
5. Leitner, M., Cockton, G., Yee, J., and Greenough, T. The hankie probe: a materialistic approach to mobile ux research In *Proc CHI EA '12* ACM Press (2012), 1919-1924.
6. Mackay, W. E. 2004. The interactive thread. In *Proc. DIS '04*. NY: ACM Press, 103-112.
7. Mattelmäki, T. and Battarbee, K. Empathy Probes. In *Proc PDC2002* Malmo 2002.
8. Mattelmäki, T. *Design Probes*. University of Art and Design Helsinki. 2006.
9. Mauss, M. *The Gift: The Form and Reason for Exchange in Archaic Societies*, trans. W. D. Halls, London: Routledge. ([1923–1924] 1990).
10. Paulos, E. and Beckmann, C. 2006. Sashay. In *Proc. CHI '06*. NY: ACM Press, 881-884.
11. Paz, O. *In Praise of Hands: Contemporary Crafts of the World*. New York Graphic Society. 1974.
12. Sennett, R. *The Craftsman*. Penguin Publishing, 2008.
13. Wallace, J., Wright, P., McCarthy, J., Green, D., Thomas, J. and Olivier, P. A Design-led Inquiry into Personhood in Dementia. In *Proc CHI 2013*, ACM Press (2013).
14. Wallace, J., Thieme, A., Wood, G., Schofield, G. and Olivier, P. Enabling self, intimacy and a sense of home in dementia: an enquiry into design in a hospital setting. In *Proc CHI 2012*, ACM Press (2012), 2692-2638.
15. Wallace, J. and Press, M. All this useless beauty *The Design Journal* 7, 2 (2004), 42-53.
16. Wallace, J. and Press, M. Craft knowledge for the digital age. In *Proc 6th Asian Design Conference* (2003), 14-17.
17. Wright, P., Blythe, M., and McCarthy, J. User experience and the idea of design in HCI *Interactive Systems. Design, Specification, and Verification* Springer Berlin/Heidelberg (2006), 1-14