Self Constructed Representations: Design Research in Participatory Situations.

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Abstract

This paper proposes that the blurred line between designer and researcher can have a positive effect on design processes. The aims of the paper are firstly, to show how design ethnography is an emerging field of design practice in its own right, and secondly, to give some examples of how open ethnographic methods have been used in public-facing field research. Finally, to propose some recommendations related to the design of open design-ethnographic instruments and activities.

Design ethnography integrates two distinct understandings of ethnography. The first is observational, designers present people with designed objects and observe how they interact with them (Houde and Hill, 1997). The second is shaping, designers give participants unfinished prototypes or sketches and invite participants to modify them (Baskinger, 2010). Designerly ethnography involves methods more familiar to designers than to ethnographers, and may be directed towards more general categories of inquiry than product development. This idea draws on Ingold's (2013) concept of correspondence with materials as a way of awakening the senses to experience.

This paper presents findings from three case studies related to the externalisation of digital experiences. The case studies are positioned as participatory design research involving the creation of self-constructed formative representations. The instruments and methods described include drawing, diagrammatic modelling and physical making. These are seen as externalising instruments whose purpose is to illuminate how people think about their own digital experiences. Findings show that materials have a profound effect on how externalising instruments work, and that a balance between complexity and accessibility is important.

Introduction

In the following section I will outline the various attitudes design has taken towards ethnography, and position this paper, and my own research, relative to them. Designers have traditionally deployed ethnographic-style methods including observation, photography, video and interviewing to find out about the people for whom they are designing. Often, these methods have been used in controlled or semi-controlled settings, such as an organised workshop or user testing set up. I term these ethnographic-style methods because they do not feature many of the characteristics of ethnography as practised in anthropology, such as long-term engagement with a specific group pf people, or an emphasis on field work.

Design ethnography has worked in three main ways. Firstly, in methodological sympathy with anthropology, designers observe people using objects and systems they have designed. The observational approach focuses on the iterative development of products. This involves presenting people previously identified as potential users of a design product (physical or virtual) with an early version of that product, usually in the form of a prototype. Design prototypes

can take many forms from cardboard architectural models, to diagrammatic representations of software products and can also be presented at different levels of fidelity (Houde and Hill, 1997) in order to fulfil different requirements of the design process. The prototype is then developed in response to user feedback and re-presented to the user group repeatedly, over time. This version of design ethnography demonstrates the indivisible relationship between people and design outputs - the purpose of the ethnographic work is productive - it is intended to bring about perfected products.

The second direction for design ethnography has been more active and participative. Instead of designers producing ever more faithful versions of their ideas to ask people about, they actively involve people in the design process. This means designing activities and settings conducive to participation, and making choices about what materials to use, how they should be combined, and which people to include. Participative design is ethnographic to the extent that it involves people, and open to the extent that outcomes are rarely predictable. Like observational design ethnography, it is centred around the generation of new forms in partnership, usually guided and facilitated by designers. The extra dimensions of ethical and political conduct when involving participants directly in the design process have been of particular concern to designers working in this way. A preoccupation with context, and the influence it may bring to bear on design activity, has led to increased awareness of the spaces - moral, political and physical - in which designers operate. Litts and Searle (2015) call this being 'culturally situated and context dependent'.

The third direction for design ethnography has been harder to pin down but is perhaps exemplified by Moore's (1982) research eliciting reactions to the aged while disguised as an elderly woman. This strand of design ethnography could be termed provocative, or speculative, or more broadly - generative of insight rather than products. It involves designers using their creative and experimental skills to design elicitation methods, to produce research artefacts, or to develop design-oriented ways of finding things out about people - what is often termed designerly ethnography. Dib (2010) suggests that in this context 'the promise of the prototype is… that it breaks free of its intended function while fostering a conjectural quality'. That conjectural quality is associated with inquiry into 'how designed objects can produce new perspectives on socio-material interactions' (Lenskjold, 2014). Lenskjold connects this approach to the artefact-centred use of prototypes in design research by arguing for prototypes that lack 'a specific purpose and a precise criterion of evaluation'. In the next section I will outline the basis of a theoretical background for this approach with reference to research in anthropology and design.

Background

Ingold (2013) argues that the distinction between ethnography and anthropology is one of intention. Ethnography, he says, is concerned with documentation and description, it is generative of data from which ethnographers attempt to generalise about social conditions or about how social groups live in the world. It can involve artefacts and objects, creative activities and prototypes, among other methods. In contrast, anthropology for Ingold has 'speculative ambition' (2013: 4), it attempts to 'join with people in their speculations about what life might or could be like' (italics in original). It is not dedicated to data gathering, nor to transforming observations into data for subsequent analysis. This definition evokes the role of designerly inquiry to the extent that Ingold places great importance on making things as a central element of anthropological work, and on the open and inquisitive nature of anthropological research. By involving themselves in making physical artefacts, anthropologists inhabit a way of 'knowing from the inside' (2013: 5), which Ingold contrasts to the orthodox model of academic knowledge production. While I do not intend to position the disciplines of anthropology and ethnography as distinct from each other in quite the same way as Ingold does, it is relevant to this paper that there is an echo of Dib's 'conjectural quality' in his definition of the openness possibilities in anthropological encounters. Similarly, the idea of knowing about things by making them, or being involved in their physical production, is a very familiar one to designers.

Cross (2006) connects to this last idea by arguing that there is a 'designerly' way of knowing things, making things, thinking about problems, and developing new forms. His analysis is limited to design education and a discussion of what designers do, but there are some general principles about how designers design that are relevant to my research. Cross mentions design process and design products as the twin strands of designerly knowing. I will focus here on

design products. Cross maintains that objects 'are a form of knowledge about how to satisfy certain requirements' and 'how to perform certain tasks' (2006: 9). In line with Ingold, I expand this somewhat functionalist definition to include the possibility that objects are also a form of knowledge with which to inquire about human life, to bring about improved conditions, and to imagine alternative realities. One important affect of the attention designers pay to objects (digital or physical) is that design activity involves being what Cross calls 'immersed in material culture' (2006: 9). Objects are made of materials, designers manipulate materials into various configurations. In Cross's analysis designers are also fluent in the language of their respective media, 'and draw upon it as the primary source of their thinking' (Ibid). Designers are profoundly involved with materials - what Ingold calls 'correspondence', and what Sennett calls 'engaged material consciousness' - they are adept at reading the meaning of existing objects and encoding those meanings into new forms. Like Dib, Cross goes further, quoting Douglas and Isherwood (1979) in urging people to 'try (instead) the idea that commodities are good for thinking; treat them as a nonverbal medium for the human relative faculty' (1979: 62). This represents an opening of what objects can do, and suggests their usefulness in what we may call an open designerly ethnography. I would like to relate this point firstly to participative design research, and secondly to the role of instruments in design research.

The practice of co-creation, participative or participatory design research as defined by Sanders and Stappers (2008) includes some important points for this paper. These include; the role of the design researcher, the intentions of designs, and the artefacts used in co-creation settings. Starting with the first, it follows that if the design process is opened up to participants in group situations the role and function of the design researcher will change. Sanders and Stappers call this a move 'from translation to facilitator' (2008: 11). They also make the important point that the researcher may also be a designer, and may be working with materials whilst, as Cross has it, drawing on them 'as a primary source of their thinking' (Cross, 2006: 9). The twin role of designer and researcher is here conflated into a single person, working with others to generate new forms in a constructed collaborative situation. The intentions behind the objects used for design research are very different to how design is traditionally thought of i.e. not oriented towards new objects as perfected examples of say a kettle or a chair, but instead intended to draw out certain insights or experiences. Sanders and Stappers (2008) define this as designing of or designing for (my italics). Designing of involves the recognisable disciplines of a design studio; product design, vehicle design, interior design etc. i.e. the design of furniture, cars, and rooms. Designing for means thinking about a human centred purpose and involves designing for say, emotion, interaction or sustainability. In the case of my research it means designing for externalisation. Finally, involving non-designers in the doing of design means developing tools and instruments that they can use without the specialised knowledge provided by a design education or professional design career. Design work thus includes the design of elicitation artefacts. I will call these instruments to distinguish them from an association with collections and museums that the word artefact evokes, and to emphasise that, like a hand tool, they have a specific purpose - in my case the externalisation of digital experiences. Opening up the design process to include the collaborative design of research instruments, whose purpose is to elicit representations of personal digital experiences, is thus an example of open design ethnography, one that allows designers to experiment with conjecturing forms.

In this section three views of design research were discussed; Ingold's definition of anthropology as an opening towards material correspondence, Cross's hypothesis that design has a special epistemological status as a way of knowing about the world, and Sanders and Stappers' exploration of what co-creation means for designers and for design objects. In the following section I will develop the concept of externalisation from the perspective of externalising instruments and their use by participants to represent personal digital experiences.

Externalisation

My research seeks to re-materialise specific examples of the everyday experience of digital systems. Digital experiences reach into many aspects of human life, for example, the way people make and maintain relationships, search for and carry out their work, and diagnose and treat illness. Increased awareness of the ways in which providers of large scale digital experiences profit from their many users has produced new understandings of how digital technologies often represent an asymmetrical power relationship. Using a tracking algorithm, social networking systems build up a detailed representation of their users' social behaviour, including who

they communicate with, what they say, images they share and their geographical locations. Online social networks may therefore have a more significant and informative model of the extent and characteristics of users' social networks than users do themselves. There is thus a need for people to be able to observe their own interactions with digital systems, and how they shape relationships, habits, and understandings of how digital systems work.

Personal digital experiences are internalised through repeated encounters with artefacts in the form of complex technical systems, such as browser software or digital cameras. In order to bring about externalisation, instruments that provide a focus for attention are important (Wojtczuk and Bonnardel, 2010). For my research, physical objects, visual representations, and spoken accounts are the focal points around which externalisation occurs. Dix and Gongora (2011) suggest that representation is important in the process of developing a counterbalance to the formative influence of digital systems, and present three types of representation by externalising instruments; schematic, symbolic, and isomorphic. My analysis will therefore look for what types of representations are elicited by different instruments, with particular attention to materials and activities. My research thus focuses on the material characteristics of externalising instruments and how they influence the ways digital experiences are revealed. The whole field of design – vehicles, services, graphics, interfaces, architecture – can be thought of as knowledge embodied in different forms of externalisation. The materials used in the process of externalisation have a profound influence on the resulting forms or instruments, and through them on how knowledge is constructed and internalised. For example, people using physical materials tend to explore through examples, while those using pen and paper through abstract categorisation (Ramduny-Ellis et al, 2010). The designer of instruments intended to produce externalisations should place careful attention on the material properties of those tools. In the next section I will describe the externalising instruments I developed and report on the settings and contexts of the research.

Browser history comics

This case study is focused specifically on a visual narrative construction of browser history in the form of comics. Weinreich et. al. (2006: 13) observe how 'the data of clickstream logs have a limited expressiveness, as aims and tasks of the users often stay below the surface'. This case study consequently questions the usefulness of the browser history list and proposes a way of allowing those aims and tasks to come to the surface. The browser history list is an algorithmically derived chronological log of web pages visited. It does not provide any insight into why a site was visited nor the context of a browsing session. Browsing the web results in an impression of 'fog', 'zoning out', and comments such and "oh my god, what have I done with my time?" Many participants report this experience. There is very little differentiation between web experiences in terms of navigation or visual recognition, i.e. social media sites look and work in similar ways, online clothes stores look familiar and it may be hard in retrospect to tell one from another. There is also little differentiation between sites, pages, and platforms.

Figure 1. Minecraft and marriage

The first example of self constructed representations were done by participants who created comic style representations of their browser behaviour. The use of comics drawing as a research method includes Social Comics (Lapides et al. 2011) in which participants are invited to act out scenarios in a

digital game setting that are then captured for inclusion in a comic-like photo story. Comics in the form of storyboards have also been used extensively in user experience design (Kantola and Jokela, 2007, van der Lelie, 2006) as way of demonstrating hypothetical scenarios for how people might use a digital system. In order to provide a way for participants to represent their browsing behaviour I asked them to draw their browser history lists in comic book form. Participants were asked to draw their browser history list on A4 paper sheets printed with empty graphic panels. I did not specify how much of the browser history list was required, nor any particular style or visual language. Materials were not kept in a central place but spread across the table with

Figure 2. Web search

multiple packs of pens, ink and brushes and piles of printed sheets. There were no specific instructions about how much of the browser history list they should include, nor how far back they should go through the list. In addition, there were no limitations placed on§ how many sheets participants could use, nor which materials they should employ in illustrating their browser history. No time limit for the task was specified. After the task was completed, participants were asked to describe what whey had done and why. These interviews were filmed, and used the completed comic as

Figure 3. Social media abuse

a stimulus to talk around the topic of browsing, browser behaviour, recalling browsing sessions, and remembering the motivations and reasons for visiting the various websites shown. Stimulated recall was used to add to the richness of participant descriptions and to connect interpretations of web browsing directly to the comic artefact. Transcripts of the interviews were then coded for themes relevant to how externalising instruments work to represent browsing experiences.

The design input of this research involved designing the activity, the setting, and the instrument. The activity consisted of drawing on paper with a variety of different materials. The setting was a public arts centre in Liverpool. The instrument was a selection of different empty comic layouts printed onto A4 paper sheets. In an important sense then the activity, setting and instrument remained open. The activity was open to the extent that people were free to choose what to depict,, how much of their browser history list to represent, and at what level of fidelity. The setting was open in the sense that the activity took place at a free public arts centre, with no physical or schedule acting as barriers to participation. The instrument was open in that it did not specify what should go where, or what sequence images should appear in, nor in fact that there should be images at

all.

Findings

Findings from the browser history comics workshops include; imposing a self defined structure onto an otherwise elusive experience is useful for externalisation. For example, the comic book form encourages textual annotation of visual images, this means people can clarify what aspect of browsing they want to talk about by labelling it (see figure 2). Textual annotation also means digital entities can be personalised using speech bubbles (see figure 3). In addition, objects can be titled, logos can talk and digital operations such as file conversions listed. The comic form also imposes a narrative structure and frames browsing as a staged sequence of impressions and events.

Figure 3. Social media abuse

Often, in the browser history comics these impressions are juxtaposed or multiple browser operations are conflated to a single panel. The openness and flexibility of the comic instrument allows participants to decide which browser experiences to emphasise and supports the contextualisation of browsing activity such as a grouping of sites visited into a single topic i.e. marriage (see figure 1). The comic form also encourages the narrativisation of browser behaviour as a way of rendering what can be an otherwise confusing and overwhelming experiences into a coherent account. Finally, the complex and abstract nature of web browsing requires a simple structure and an open form to work effectively. Next I will describe an externalising instrument used to model digital social networks.

Social network models

This case study explores the design and use of a physical, non-digital instrument to model personal social networks. Connections are made physically between nodes by stretching elastic bands between coloured pins representing people. The emphasis is on how people choose to represent their networks, what they choose to show, and how the process contributes to uncovering an otherwise invisible set of relations.

Participants were asked to push coloured pins into a white painted cork tile, after placing a white pin representing themselves. The next step was to connect the pins with correspondingly coloured rubber bands, and then annotate the represented individuals with text. Pins were categorised as representing; ‘friends’, ‘family’, ‘colleagues’, and ‘others’.

Alongside the physical instruments I conducted semi structured Interviews with participants, encouraging them to talk about what they had done. These interviews were then transcribed and annotated, with particular attention to the role of materials in the process of externalisation. There were no specific instructions about who should or could be shown in the model, nor about how many, or how few connections it was necessary to show. Printed A3 sheets were provided which featured a legend with colours matched to categories, for participants to refer to while doing the task. Participants were limited to one tile only, and to the specific materials and colours described. No time limit for the task was specified.

The setting for this group workshop was a street level former shop front in South London. The unit had three large shop front windows to the street making all the activity inside visible to passers-by. As the workshop progressed over two days, the space was dressed with examples of previously completed network tiles. This provided some inspiration to participants about what the outcomes could be, and also worked as a visual tally of the number of respondents. There were some differences in openness between the browser history comics and the social network models. Firstly, the activites, the people and the outcomes were visible to all from outside the space, which was freely accessible to passing pedestrians. Secondly, the materials used to create the models were more constrained. Participants could use only one tile, could use only pins and rubber bands, and could combine them in a pre-defined set of ways i.e. by connecting different coloured pins with correspondingly coloured bands. Finally, the task was more abstract and did not involve visual representation.

Findings

The nuances of human social experience - degrees of friendship, inclusion in circles of work or family connections, or the different roles people embody in a network of social relations - are flattened by digital social networks to ‘friend’ or ‘contact’ or similar terms. Physical externalising instruments allow for unflattening. This term refers to the process of re-dimensioning the experience of digital social networking and re-introducing the enriching complexities of lived experience. Unflatenning is a metaphorical idea, but in this case study there is also a literal element to the term since pushing pins into a surface and linking them with rubber bands is not an activity confined to a printed page or

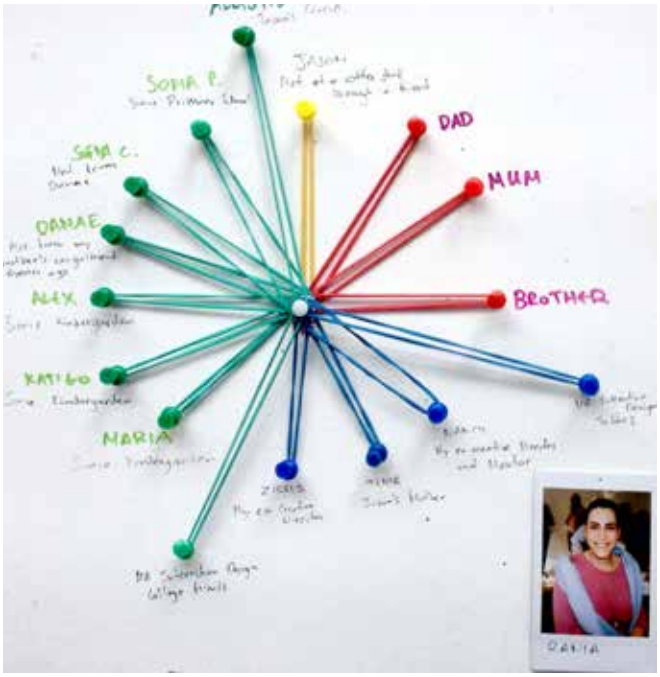

Figure 4. Clock shaped network model

to a computer screen. Unflattening therefore involves adding dimensions to the representation of digital experience where it involves building and maintaining a digital social network. Unflattening reveals subtlety, is creatively rewarding, and allows for complexity to emerge (see figure 5). Unflattening is an effect of externalising instruments and activities oriented towards physical materials and tangible interactions. The use of a physical externalising artefact thus affords adding subtlety to an otherwise flattened digital experience.

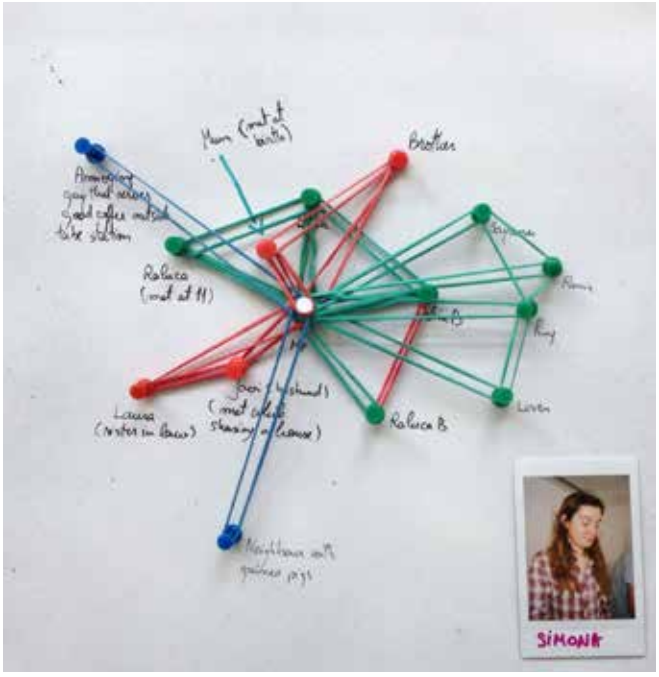

Figure 5. Friends and acquaintances

Most digital social networking systems do not allow the user to assume multiple identities from the same account or to operate multiple accounts from the same identity. Facebook, Twitter, Instagram, and LinkedIn all enforce this limitation. The different roles assumed by participants in their social networks are therefore flattened to a single name, profile picture, and description. Modelling their digital social networks in physical form allowed participants to assign more than one identity to themselves and others in their networks. Fo example, participants have added additional pins and connecting bands to signify different identities rather than, say, annotating a single pin. So materials may be constraining, but also afford the representation of multiple identities by allowing participants to adapt materials to personal uses. Social networks are not fixed. During the activity participants started to adjust their models in the light of what was revealed (see figure 4). Five participants moved pins to a different location on the tile while discussing their models. Ten participants added or removed connections during interviews. This demonstrated how interpretations of digital social network experiences are unstable. They are not fixed understandings but subject to transformation. This may reflect the materials used to externalise them. Dix and Gongora make the point that 'The nature of materials and tools has a profound impact on the kinds of externalisations produced.' (2007:5). So models made of pins that can be easily placed, removed and repositioned connected by rubber bands that can be easily stretched, moved and replaced influences representations of social networking.

Finally, the distinction between digital social networks and social networks in general was found to be indistinguishable. Participants did not always distinguish between online and offline social networks. This suggests both types of social network are contiguous, and a model of one may stand equally for a model of the other. In stimulated recall interviews the distinction became clearer, especially with the focus on interpretation of experience. In the next section I will describe the final set of externalising instruments.

Physical models

The third case study for which open externalising instruments were designed focused on a range of digital experiences including algorithms, online personal profiles, image metadata, and cloud computing. The difference to case studies one and two is that the activities were applied in a

real world setting, one with a pre-existing set of aims and objectives. Another point of difference is that participants worked together in groups to model aspects of digital experience that they deemed important and useful. The physical setting was a top floor office space with standard office equipment and furniture, a space familiar to most of the participants as their daily workplace. The room was large enough to work in groups but offered limited possibility for rearrangement.

Materials were chosen to complement each other as a stimulus to creative exploration. Groups of materials were placed on the tables in no particular relation to each other but available to use as required. A collection of materials, such as foil, string, paper, tape and pins was also freely available to all. Drawing on the way participants engaged readily with the cork tiles, pins and rubber bands of case study two, I did not specify how materials should be used, merely made them available in distinct combinations as follows:

Table 1
Cork spheres, copper rods, magnets, felt strips. Some pairings of materials suggest ways of constructing without prescribing how i.e. magnets are a way of connecting materials without glueing or taping. Felt strips can be tied together or pinned.

Table 2
Transparent plastic tubes, coloured ink, fishing line. Tubes can be filled with coloured liquid, fishing line can be used to suspend or connect.

Table 3
Perspex rods, pipe cleaners, wooden beads, transparent perspex hemispheres. Spheres can be filled, pipe cleaners connect to each other, wooden beads roll and can be strung.

Table 4
Reflective metallic card, coloured paper, paper straws. Straws connect to each other and can be filled, metallic card reflects paper colours. Straws cam also be blown through, balanced and grouped.

The task was thus opened more completely to participative creative exploration. Participants were encouraged to combine materials however they wished, they worked in groups, and defined the topics to be explored themselves. The outcomes were also more sculptural than the paper based comic drawings of the browser history task and the flat cork tiles of the digital social network models.

Findings

Findings from this case study include how group activity has the potential to set the criteria for future collaborative work in organisations.

'everyone goes off and does things, and it kind of becomes a glue... and so you're actually setting norms for how the group then behaves, so it's part of the social dynamic'.
D.

Figure 6. Model of cloud computing

The act of distributing knowledge throughout the participant group produces standards and examples for future practice. Doing creative work, freely exploring a constrained range of materials with a specific goal was seen as enriching and rewarding beyond the limits of the workshop itself. Being exposed to an open design research process informed adjacent areas of work within the organisation. While these effects may be unforeseeable for design researchers, they should nevertheless be aware of the wider significance of participative activities on participants and the other work they do together. Designing creative activities means

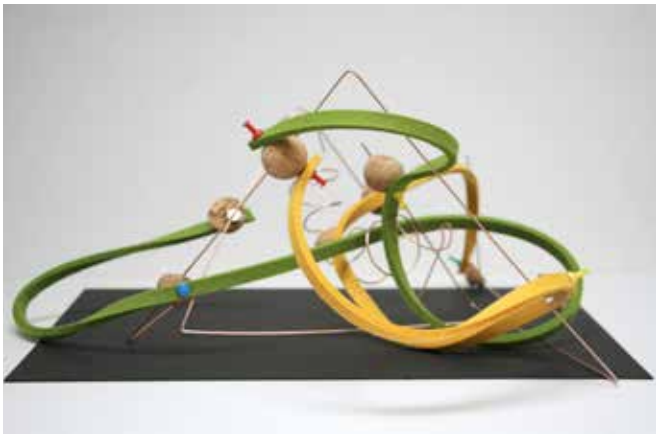

Figure 7. Model of a personal digital profile

thinking about how they should be structured, what resources they should draw on, and what affordances and limitations are necessary to implement, or important to avoid.

Working with tangible materials to elicit personal interpretations of digital experiences helps to focus attention on the salient parts of digital technologies (see figure 8). Tangible materials also break down some significant barriers to engagement for expert and non-expert participants alike.

'I think any time you have something that's hands on, and touchable and tactical, it allows for these other modes of understanding and so that can only be a good thing'
R.

Thus, participants with expert knowledge of digital systems were obliged to represent that knowledge in ways that others could understand (see figure 6). Non experts could develop representations for digital experiences,

Figure 7. Model of image metadata

such as image metadata, using accessible and easy to use materials. Tangible materials then, break down some significant barriers to engagement for expert and non-expert participants alike.

Finally, When creating externalising instruments for image metadata, algorithms, cloud storage, and online profiles, participants turned to metaphors (see figure 7).

(If we had been told to do a drawing) *'I think it would have been different in the sense that you wouldn't have been able to use as many metaphors.*
J.

There was also a recognition that the dominant metaphors used to convey abstract digital phenomena, such as padlocks for privacy, and keys for security, are obsolete and ineffective. This connects with Douglas and Isherwood's concept of the 'metaphoric appreciation' that they say designers are particularly skilled at. My research suggests that designers and design researchers can extend this ability to their participants by involving them in collaborative creative activities and choosing non-digital materials that can be easily combined and configured. In the next section I will briefly give a sense of what designers working to create instruments for participative design research should consider.

Recommendations

Recommendations for designers working in this area include how to deal with materials. The materials chosen for the creation of externalising instruments should be easy to use and accessible. Where materials are not intended to be used in any specific manner, they should be combined in unexpected ways. For example, string, ink, and clay have separate and familiar affordances and together do not suggest any pre-defined use. Materials should be human scaled. They should not be too heavy to lift, or too small to manipulate. They should also be small and light enough to be transported and passed around between participants. If materials are intended to be re-used or adjusted they should not connect in permanent ways i.e. with glue, solder or locking parts but instead be temporarily attached with magnets, string, or rubber bands. Materials should be easily obtainable from non-specialist sources. This means using common materials in new and unexpected ways. For example, using stationary supplies familiar from office environments means instruments can easily be developed by

participants themselves. Using freely available materials also demonstrates an important design principle. The imaginative potential for externalisation lies not in esoteric materials but in the tacit knowledge of participants about their own digital experiences. Using familiar materials means participants can enter the process without having to learn new skills.

The materials chosen for the creation of externalising instruments should be constrained. Setting constraints means indicating what people should do, and with what materials. The carefully selec ed set of materials, such as the cork tile, coloured pins and coloured rubber bands of case study two allowed adaptation, imaginative exploration, and personalisation to be the focus of the activity.
Materials should also be combined in constrained but complementary families. For example, one group of materials in case study three contained wire, felt, cork spheres and magnets. This group thus has two metal materials, one malleable and one connecting - and two more yielding materials, one soft fabric and one spongy cork. They are diverse but reciprocal.

Constraints make designs 'easier to use and dramatically reduce the probability of error during interaction' (Lidwell et al. 2003: 50). In the case of my research, constraining participants to drawing on a paper sheet, or sticking pins into a cork tile meant the task and the instrument was legible to participants. Norman (1988) explains how 'the thoughtful use of affordances and constraints in design lets a user determine readily the proper course of action, even in a novel situation.' (1988: 82). So, when faced with an unusual set of materials (such as mirrored card, transparent plastic spheres, and coloured string) and an unexpected task (such as physically modelling cloud computing) constraints work to clarify and simplify what participants should do.

Conclusions

The distinction between designers and researchers in the context of co-creation is blurred to the extent that the design of research methods involves creating settings, activities, artefacts, and materials. Along the range of proactive conjured by the term ethnography, this view positions design ethnography more as a form of design practice in itself, than a category of social science research or an assemblage of ethnographically oriented data collection methods. This kind of design practice is neither purely observational - although it may feature observation the form of photographic or video documentation - nor is it about the iterative perfection of physical products. Rather, it invites research participants into the kind of correspondence with materials that Ingold proposes and resonates with Lenskjold's ambition to 'produce new perspectives on socio-material interactions'. In my case this is related to the interaction between people and digital systems explored through various different materials and representing strategies.

Finding out about things by making them is emphasised by Cross and his concept of 'immersion in material culture' (Cross, 2006: 10). Design research done by designers can then also be expected to involve an immersion in materials, albeit to a different end. Knowledge production, conjectural insight or data gathering may be the intent, designed artefacts the method. Extending this argument further, by opening up the process of design to include research participants, as Sanders and Stappers observe, involves a breaking down - which is also an opening - of the distinctions between researchers and participants. This implies that participants will, by extension, also be immersed in materials when creating objects. Want these objects are able to do 'as a nonverbal medium for the human relative faculty' (Douglas and Isherwood, 1979: 62) is provoke, reveal, and elicit human values and opinions.

Finally, an open ethnography in the context of design research is one that makes specific attempts to dissolve the boundaries between designer/researcher and participants. Open ethnographic methods should feature artefacts that can be shaped, completed or invented by participants. Open ethnography can also be oriented towards exploratory and generative outcomes, ones that prioritise involvement, collaboration and conjecture.

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