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CRAZY IDEAS OR CREATIVE PROBES?: PRESENTING CRITICAL ARTEFACTS TO STAKEHOLDERS TO DEVELOP INNOVATIVE PRODUCT IDEAS

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Abstract

A number of design practices derive from and develop the notion of critical theory. Notable developers of such "critical design practices" are Dunne & Raby with "critical design", Sengers and colleagues at Cornell University's Culturally Embedded Computing Group with "reflective design", and Agre with "critical technical practice" within artificial intelligence research. And there are an increasing number of designers who, whilst not specifically explicating their theoretical ancestry, include critical elements in their products.

The reflection afforded by the products of critical design is generally seen as its endpoint. However I have used this reflection instrumentally within human-centred design activities. "Critical artefacts" have proved more useful as tools than direct questioning techniques; in particular as a way of enabling stakeholders to engage with novel situations and consequently engage in creative thinking about future possibilities.

This paper begins with a review of critical design practices. Two case studies are then detailed demonstrating my approach. A discussion of the commonalities and differences between critical design practices follows noting their relationship to critical social theory and the relationship of my work to them. Finally further research to develop generalisable methods is outlined.

Critical Design Practices

Calhoun has proposed that 'Critical social theory makes the very givenness of the world the object of exploration and analysis' (1995:8). This view questions that there is only one possible way the social world can exist and be theorised, arguing that this possibility reflects numerous historical and cultural influences. By recognising alternative possibilities and critiquing existing social theories it reveals implications for social change. Critical design practices are my umbrella term for a set of related approaches that aim for similar ends via the practice of design (in its widest sense) – by producing artefacts which afford critical reflection.

Critical design practitioners point to the underlying values and assumptions of design practices (and design research practices) and suggest problems in leaving them un-critiqued.

Dunne & Raby are concerned with the unrecognised ideological nature of design. In Hertzian Tales (1999) Dunne criticises the manner in which electronic products are designed. He argues that the products of design embody the ideologies that created them (they reflect the values of their designers and manufacturers) and that the nature of these ideologies makes it undesirable for products' users to accept them unthinkingly. In

Design Noir (2001) Dunne & Raby develop this idea further, categorising the ideological nature of design as either affirmative or critical. Affirmative design reinforces the current situation by leaving the ideologies unchallenged and conforming to cultural, social and technical expectation. Critical design rejects the current situation as the only possibility, and provides a critique in the form of design outputs embodying alternative values and ideologies.

Dunne (1999) proposes specific examples of the ideologies inherent in electronic products and the consequences of their adoption: That design generally serves a culture of consumption, leading to industrial design maintaining a society of passive consumers; That design outputs often portray didactic or utopian situations with discrepancies between them and the everyday situations they are actually encountered in; That approaches such as Human Factors are limited, producing "usable" products that 'will not confuse or disappoint' (p32). Dunne infers there are benefits to products doing more – in confounding expectations. He offers that affordances (after Donald Norman) are not fixed aspects of products to be understood; rather they are individually, socially and culturally dynamic. This leads to a form of design which is about more than just needs-satisfaction and ease of use.

Dunne & Raby (2001) suggest industrial design's role in the design of electronic products is casting designers as mere semioticians, as illustrated by the example of the Sony Walkman.[1] The original Walkman created a new kind of experience (mobile, personal music) and redefined the role of technology in public spaces.[2] The numerous subsequent designs of "walkmans" have not caused such fundamental changes, instead re-presenting the same product purpose in slightly different forms. Dunne & Raby feel that the majority of electronic product design suffers from this problem – dealing in the signs to communicate what a product does, rather than devising new product roles and purposes. They refer to this as one "genre" of product design, where 'the emphasis is on easy pleasure and conformist values' and which 'reinforces the status quo rather than challenging it' (p45).

Sengers et al. specifically focus on human computer interaction (HCI) practices, asking 'what values, attitudes, and ways of looking at the world are we unconsciously building into our technology, and what are their effects?' (Sengers et al. 2005:49). They note that there are gaps in design and research methods caused by the unconscious adoption of the values within them, for example a focus on cognition to the detriment of emotional aspects, and the dominance of work-centred approaches 'risking making all of life like work' (p49). They suggest that 'critical reflection identified particular unconscious assumptions in HCI that might result in negative impacts on our quality of life' (p49).

Sengers et al. are interested in critical reflection on practice within the practice itself (by researchers and designers), and they argue that 'critical reflection *itself*, can and should be a core principle of technology design for identifying blind spots and opening new design spaces' (p49, their italics). Critical reflection is not just for opening up approaches for designers, 'technology design practices should support *both* designers *and* users in ongoing critical reflection about technology and its relationship to human life' (p50, their

italics). In their reflective design strategies they suggest building technology as a probe to explore social practices and the practices of technology design and evaluation.

Agre argues that the design of Artificial Intelligence (AI) systems is influenced and limited by the manner in which it is thought about – how it is discussed and how this is translated via the technical construction of its systems (1997). At his time of writing, he suggested that AI systems reflected limited concepts of what intelligence is and how we interact with our environment as intelligent beings. Recognising this, he argues, is therefore important in developing a more holistic conceptualisation and design of AI systems. Although discussing AI in particular, Agre notes that there could be a benefit in including such critically reflective elements in all technical practices: 'What is needed [..] is a critical technical practice – a technical practice for which critical reflection upon the practice is part of the practice itself' (pxii).

Agre calls the influencing aspects 'substantive metaphors', showing how they are expressed by the language, terminology and attendant imagery commonly associated with particular disciplines. These metaphors 'define a hierarchical opposition between central and marginal cases, that is, between those phenomena that are readily assimilated to the metaphor and those that are not' (p45). So reasoning based on any such metaphors will be unable to adequately account for the marginal cases. Agre sees the problem with existing technical practices is that they see inadequately explained phenomena as further problems to be solved, not as limitations of the metaphorical underpinning of the practice itself.

Agre suggests that AI has suffered from being organised around a substantive metaphor he terms 'mentalism', derived from cognitive science, where 'the mind is a space with an inside, an outside, a boundary, and contents' (p27-28). Phenomena become either central or marginal according to whether they can be adequately explained by this metaphor. For example detached "cognition" and internalised "thinking" are central to this metaphor; complex interactions between individuals and the "outside" world are marginal, less easily described by the metaphor. The presence of a central/marginal divide highlights the shortcomings of substantive metaphors and the need to recognise and critically reflect on their influence on technical practice. To do so, Agre suggests focussing on the marginal phenomena to create new substantive metaphors – in this example 'interactionism'.

The exhibition 'Strangely Familiar: Design and Everyday Life' included several products of critical design practice including the work of Dunne & Raby. In his introductory essay to the exhibition, Blauvelt suggests 'design is both invisible and conspicuous, familiar and strange' (2003:14). He argues that the products of design surround us, but for most people the practices of design are unknown: '[Design outputs] tend to conceal rather than reveal the process of their making' (p14).

Blauvelt goes on to unpick some of the "invisible" aspects of design. He suggests the 'relative invisibility of design is also a matter of perceptual survival', if new products didn't merge easily into our everyday lives, life would become "an ever-changing visual cacophony' (p15).

Whilst Dunne & Raby, Sengers and Agre are conscious of and explicate the theoretical drivers of their work, other practitioners operate in a more intuitive manner. There is a growing group of designers who direct some of their work towards satirising their own profession, appreciating a need to challenge design practice and products' roles within consumer society. The provocative and challenging concepts they produce could be comfortably described as critical design, but perhaps the thinking behind them and their ultimate aim is less driven by a conscious critique and exposition of contemporary values and more a desire to "poke fun" at the products of a rampant consumer society.

For example the Human Beans partnership of two design professionals state their manifesto as: 'We make fictional products by hacking commercial culture [..] Our aim is to challenge assumptions and point in new directions' (2006). Several of their 'fictional products' seem to fit the definition of critical design: "Mr Germy" is a bacteria-infused chewing toy to boost infants' immune systems; in buying "Live Cigarettes" you collect points for the treatment of smoking-related diseases; "Mute" is a hearing aid for the hearing able. These product concepts afford critical reflection on ideologies based around hygiene, healthy living and the roles of assistive technology.

figure 1. *Mute* (Photo: Human Beans)

Human Beans are interested in the experiences surrounding products in contemporary society - how we use products, how products are marketed to us, the identities and aspirations we develop around products. As designers working within design and marketing they are experienced in the tactics used to influence these experiences. Their approach is a more "designerly" intuitive application and satire of these tactics rather than a philosophically-informed and directed critique. The manner in which Human Beans present their fictional products illustrates this difference. Whereas Dunne & Raby concentrate on communicating the functional purpose of their concepts, Human Beans go beyond this to communicating the numerous ways of encountering their concepts as "real" products. Their concepts are presented via realistic packaging, advertising and other promotional materials (see figure 1). Although their theoretical position may be less defined, Human Beans concepts' power is in their believability, which has been achieved through the intuitive knowledge of practicing designers.

The work of the designers who belong to the Droog Design collective could be seen as pioneers of "satirical design". Droog Design grew from an exhibition curated by Dutchmen Renny Ramakers and Gijs Bakker in 1993. The Droog designers are united by their "dry" mentality (droog meaning dry in Dutch). ''Dry' as that essentially Dutch inclination to 'do normal' and at the same time critically investigate what you're doing and the way you do it.', '[Droog designers] need to share a mentality that looks at design as both functional statement and conceptual discourse' (Droog Design 2007). But again the emphasis of Droog products is of presenting artefacts that could be (and often are) marketed and sold.

Practices which apply critical reflection for similar ends to critical design have also been developed in other areas, for example Fuller has written about the idea of "critical software" (2003). Fuller describes critical software as 'pieces of software designed explicitly to pull the rug from underneath normalised understandings of software' (p22). They are intended to reveal and afford reflection on the underlying facets of software in both its design and use.

In my work I have used critical reflection more instrumentally as part of human-centred design activities. Two case studies are now presented to illustrate this approach.

Case Study 1: Digital Photograph Collections
This project explored how stakeholders could be involved in the development of new product ideas, in particular new ways of using digital photograph collections.

Several ideas provided the impetus for the project. Others have recognised that the increasing number of digital photographs taken is creating an information management problem for many people, particularly if those photographs are stored and organised on a personal computer (Weinberger 2004). The development of new technologies such as electronic ink displays (e.g. E-Ink 2004) and computing paradigms such as ubiquitous computing (Weiser 1991) means that the organisation and display of images need not be limited to established paradigms of paper prints or a computer monitor as represented by the introduction of electronic photograph frames e.g. (Philips 2005). Consequently there

was an opportunity to develop more novel digital photograph products. The challenge was to ensure that these product ideas were driven by a rich understanding of stakeholder needs rather than by technology alone.

The needs of families with young children and older people were chosen to be investigated as both these broad categories of people make extensive use of photographs, specifically the idea of so-called "family album" photographs. Representatives of these two groups took part in the research activities.

An initial approach was to use low fidelity prototypes (after Ehn & Kyng 1991) with stakeholders to develop an understanding of their needs. In conducting these activities a common limitation became apparent. Stakeholders had difficulty responding usefully to the prototypes as the novel application of technologies they illustrated was unfamiliar. People find it hard to articulate what they need if they don't know what they can have.

Stakeholders were briefed about the potential of electronic ink displays and wirelessly networked devices (described as "magic paper" to remove potentially confusing technical jargon) and then encouraged to engage in creative thinking about future possibilities. To enable this, a variety of roughly-made cardboard frames, coloured label "buttons", and blue foam and plasticine "controls" were provided for participants to manipulate. However participants generally responded by devising systems based on their existing experiences. A participant from the families with young children group was observed devising a system where a moving pointer selected images from textual lists displayed on a screen, very clearly derived from her experience of using web browsers. A couple from the older people group rejected the prototypes altogether preferring traditional photograph albums, reluctantly offering that a numeric keypad could be added to select the date range of the photographs.

Prior to this, I had found that the use of more direct questioning strategies such as questionnaires and interviews had much the same limitations. Questioning strategies, whether they attend to responses to direct questions or responses to prototypes, have the same limitation – the responses are dominated by the experiences of the questioned. Novel products create new, unfamiliar experiences which questioning strategies have difficulty exploring. So to develop a rich understanding of stakeholder needs to inform the development of novel product ideas, an alternative approach to questioning was required.

Having chosen managing digital photographs as a vehicle for the research, I had set out to discover how stakeholders might best explore what forms of products could be developed, and the wants, needs and values they should reflect. In order for these product ideas to be novel they needed to go beyond familiar ideas of the use of photographs. Critical design offered a way to suggest alternative aspects and afford critical reflection on them.

A set of six critical artefacts were designed and presented to two workshop groups of three participants (combining representatives of the older people and families with young

children groups) as valid design proposals which they were invited to critique. The artefacts were presented via scenarios told using "photo essays".

For example the *Forget Me Not Frame* (figure 2.) is a provocative design concept devised to explore issues of social etiquette and dynamic display of photographs. The frame has a lever on its side that fades out the photograph, the lever also slowly descends over time and needs continually pulling up to prevent the photograph disappearing. The frame also communicates with other digital photograph devices. For example in the photo essay: my mother is on the phone to me; we have an argument and she slams the phone down; then walks over to the *Forget Me Not Frame* and pushes the lever down; this "disappears" the picture in the frame; but also any other photos of me displayed elsewhere.

figure 2. *Forget Me Not Frame*

The artefact scenarios prompted illuminating discussions from the participants, which I videotaped to enable me to participate as designer and later step back as detached researcher observing the interactions that took place. Although participants could not imagine wanting the products, they did engage with the ideas and concepts expressed through them. For example the *Forget Me Not Frame* prompted that 'the whole concept of wiping someone out [is] horrible', but participants went on to discuss the effects of changing family relationships and how being able to "edit out" particular photographs could be beneficial – i.e. with an increasing number of relationships ending in separation and divorce, it could be socially tactful to remove certain photographs on display during family visits.

The workshop discussions informed the ongoing design exercise, creating a rich understanding of stakeholder needs relating to these unfamiliar situations. This was expressed as explicit themes to be considered in the design of digital photograph products. For example the emotional connection people have with personal photographs means that their use and display should be "open-ended" – people dislike such emotive material being automated or controlled.

The themes were taken a step further and expressed via another series of artefacts. These "way marker" artefacts had a greater balance of practicality and novelty than the critical artefacts and indicated potential areas for new product development. For example the *Picture Grabber* way marker (figure 3.) developed the idea of tactfully changing photographs with a physical device to "drag and drop" images.

figure 3. *Picture Grabber*

This project showed that there was value in using critically designed artefacts within this design activity and that the approach might be usefully applied to other human-centred design contexts.

Case Study 2: Design and Ageing in the Home

This project fits within a broad enquiry theme with colleagues at Sheffield Hallam University into ageing, design and well being. The project was intended as a scoping study to inform future work in this area. It aimed to explore how domestic environments could adapt for ageing population needs whilst remaining attractive and satisfying places to be. It also provided another human-centred design activity in which to apply the instrumental use of critical artefacts.

People are living longer and older people comprise an increasing proportion of the population. The United Nations reported that by 2050, 20% of us will be 60 years or older and 'the older population itself is ageing. The oldest old (80 years or older) is the fastest growing segment of the older population' (2003).

There are numerous research projects into the effects of ageing, and several design projects developing products and environments for an ageing population. However these often focus on the 'medical model' of appreciating stakeholders' needs (Newell 2003) – treating the "symptoms" of ageing with design "cures". Design has the potential to reconcile older people's needs and aspirations – products could be useful and desirable to

all in addition to alleviating the effects of ageing. We also recognise the opportunity to use design as a way of exploring the context itself – contributing to a rich understanding of the ageing population in addition to designing for them.

Eight members of the Sheffield branch of the University of Third Age (U3A) participated in the study, aged between 60 and 90 and all living independently in Sheffield. The study consisted of three phases of activity surrounding three stakeholder workshops lasting around one hour.

I described the series of workshops to participants as an ongoing "dialogue". In the first workshop participants would be talking to me, the primary aim being to gain some "inspiration" for the critical artefacts I would create for later workshops. Participants were asked to bring in examples of (or images of) two artefacts from their "living rooms" that were a favourite and a nuisance (but necessary), which then formed the starting point for discussion.

In the second workshop I would be "talking back" to the participants via a set of critical artefacts; with the aim of suggesting some new situations for reflection and discussion. Five artefacts were presented to the participants who were told to see treat them as "conversation starters".
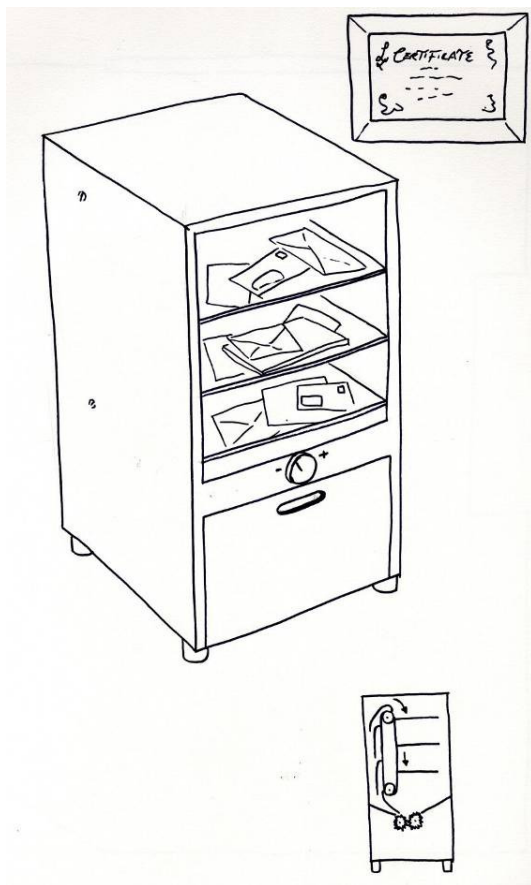

figure 4. *Prioritiser*

One of the themes that emerged from the first workshop was the problem of "clutter". Participants felt overwhelmed by a miscellany of items that seem to be an unavoidable part of everyday life: bills, letters, junk mail, newspapers and magazines. The *Prioritiser* concept was developed in response (figure 4.). All incoming post is placed on a shelf in the *Prioritiser* to be dealt with in future, most important items at the top. The shelves slowly descend and, when reaching the bottom, drop their contents into a paper shredder. The owner of the *Prioritiser* is given a certificate entitling them to shred any post that does not ensure their attention before it reaches the shredder. Participants related a common anxiety of needing to deal with their "clutter", the *Prioritiser* encouraged them to imagine a situation where this anxiety is challenged.

Another theme which emerged in the first workshop was the conflict between personal independence and community dependence. Participants felt that the effects of ageing meant they were increasingly dependant on others, but this dependence could be detrimental to their well being as their sense of personal independence was eroded. The decline of local feelings of community exacerbates the problem – participants were becoming less likely to seek the help of their neighbours. The *CommuniTools* concept was developed in response (figure 5.). A block of apartments has a new type of ceiling light for easy, self-maintenance. The light has a tool to lower it, a tool to open the light fitting, and a tool to remove and replace the light bulb. However there is only one tool per apartment and none has all the tools.
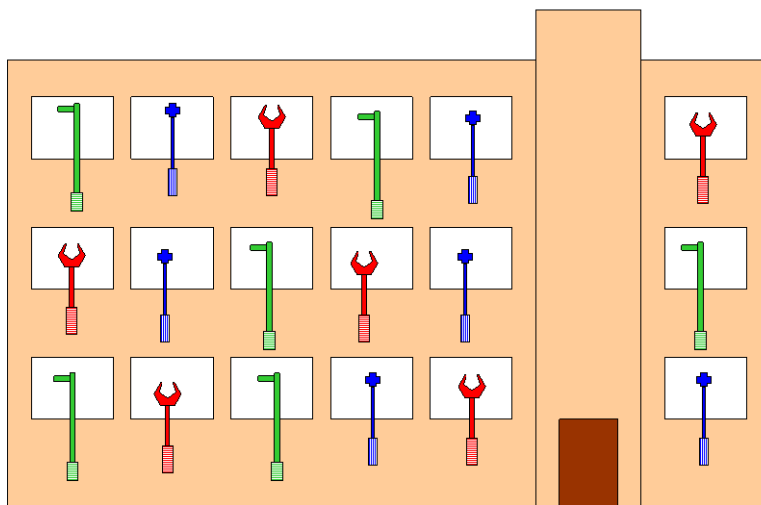

figure 5. *CommuniTools*

This artefact prompted discussion of the value of social interaction for mental well being – combating loneliness, maintaining a sense of personal worth and developing support networks. However concern was expressed at the idea of having behaviour "designed" (to force situations for social interaction).

In the third workshop I presented a second set of critical artefacts to participants, influenced by the discussions that took place during the second workshop. The aim being

to explore some of the areas outlined in the second workshop in greater depth. Three artefacts were presented to the participants, again as "conversation starters", additionally they were told the artefacts demonstrated 'what I think you think...'.

For example the response to the *CommuniTools* concept suggested it could be better to design social interaction "by subterfuge'" – i.e. in a less explicit manner, as a by-product of design rather than the main objective. This led to another concept *CommuniCycle* (figure 6.). The main perceived objective is to replace the British system of numerous wheeled bins for collecting household waste (with consequent space and collection implications) with a mini-recycling station for every few homes, thereby creating numerous opportunities for social encounters with your neighbours as a by-product.
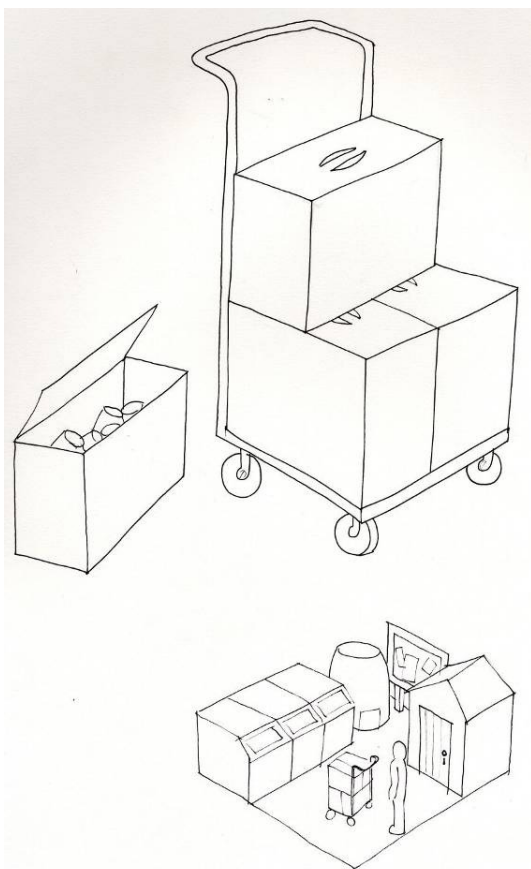

figure 6. *CommuniCycle*

Again this project showed the usefulness of presenting critical artefacts to stakeholders within a design process. The study also suggested themes to be explored in further work, some of which were expressed as "way marker" concepts.

Discussion

My research is concerned with the implications of critical design practice rather than critical social theory. But it is useful to note how critical design practices can be mapped against, for example, Calhoun's description of critical social theory (1995:35). This

comparison highlights a common position that they all hold, although their specific interpretations vary, relating to the traits of critical social theory as described by Calhoun:

- The "way things are" is not the only possibility and reflects underlying, often hidden, factors;
- The unthinking acceptance of these factors causes problems; so
- There is a need to recognise and critically reflect on these factors; and
- There is a need to explore other possibilities; and
- Thereby affect an improvement in the "way things are".

So the "way things are" is the design and use/consumption of electronic products for Dunne & Raby, the design and research practices of HCI systems for Sengers, and the design of AI systems for Agre. Each cite underlying factors: the ideological nature of design (Dunne & Raby), HCI's focus on cognition and work (Sengers) and the limitations of "substantive metaphors" (Agre). Each note problems in the unthinking acceptance of these factors: the continuation of passive consumption and the production of "unpoetic" products (Dunne & Raby), HCI systems' negative impacts on quality of life due to the "gaps in practice" (Sengers), and the development of AI systems' behaviour that does not adequately reflect real world phenomena (Agre). And each has their own way of exploring other possibilities: Dunne & Raby create "design noir", "para-functional" or user-unfriendly products, products as value fictions with poetic dimensions; Sengers builds technologies as probes and provides for open interpretation; Agre creates new substantive metaphors for AI by placing at the centre phenomena that were previously marginalised; Blauvelt suggests designers use aspects of the everyday to make the familiar strange; and "satirical designers" make believable products and promotional material with subversive content.

In all the above points, the practitioners may differ on the details but they are broadly doing similar things. It is their approaches to the improvement in the "way things are", that varies greatly - where the improvement is afforded, how critical reflection is used to make this improvement, and consequently the roles of the artefacts produced from their practice. In this last respect my work differs and develops from these existing practices.

All critical design practitioners are attempting in some way to make their respective practices more "effective" - whether it is a more holistic appreciation of practices' contexts or a greater public awareness of the impacts of practices. The difference is whether this improvement is in the practitioners' own practice or their practice in general and/or the social world it affects. Is criticality used *within* their practice or produced *outside* their practice? Critical design and the work of satirical designers are about putting critical artefacts "out into the world". They aim to improve the practice of design in general by affording critical reflection in others. Critical technical practice and reflective design aim to improve their own practice by affording critical reflection within it. My approach is closer to the latter situation - using critical reflection instrumentally within a design process.

Alongside this are the differences in the roles of the products of critical design practices. The role of Dunne & Raby's concepts (and, less explicitly, those of satirical designers) is

to afford experiences of critical reflection. In this respect they are perhaps closer to art objects than designed products – they are intended to make us think. But it is rather too simplistic to classify these products as art rather than design. Most designers would be happy and familiar with designing certain of critical design's aspects into their work (affecting social change, countering passive consumption etc.). So perhaps Dunne & Raby are offering a new type of product, with a new way of consumption – experiences for rent? Either way they do not reflect the usual function of design – "mainstream design" as Dunne refers to it.

A definition of mainstream design could be: making things to afford an improvement in our experiences of our environment. Dunne & Raby seem to be saying that there is little further work to be done improving things in this respect, so design should be making things to afford *reflection on* our experiences of our environment. Mainstream design is primarily about offering answers, Dunne & Raby suggest that design should now be about asking questions.

Agre's critical technical practice produces AI systems that better represent real world phenomena. Sengers' reflective design produces HCI systems that offer a more holistic satisfaction of needs and afford some critical reflection of their use. In this respect they are both closer to what Dunne & Raby would term mainstream design. They are primarily about producing answers.

My approach is also closer to the idea of mainstream design. The critical artefacts produced serve the role of "probes" within human-centred design activity - tools for exploring problem contexts and generating needs-focussed product ideas. The critical artefacts are instrumental in developing better "answers".

Although the idea of critical theory provides a departure point for the practices described above, it is less useful for my own work. More relevant here is the work of Ehn & Kyng (1991) who demonstrated a process that engendered new thinking in product development. Their use of low fidelity prototypes allowed stakeholders to engage with a novel situation in a manner that revealed knowledge about their working practice and how the design of novel systems might support it. Specifically a newspaper editorial team's engagement with "cardboard computers" informed the design of computer-based publishing systems before they were being used in the industry; it allowed them to engage with a novel situation in a way that usefully informed design thinking (see also Rust 2004:78). My use of critical artefacts is in a similar vein.

Gaver & Martin discuss an application of critical design within design practice for more instrumental ends (2000). They produced a "workbook" illustrating twenty 'conceptual design proposals'. These concepts express alternate values to 'functionality and usefulness' for digital devices, thereby suggesting that digital devices might embody alternative values but also affording reflection that they already embody a restricted set of values. They function as critical design, affording critical reflection.

Gaver & Martin presented the workbook concepts to their collaborators as inspiration, to 'encourage people to imagine living with them, raising many of the sorts of reactions that might be encountered if they actually existed' (p215). They describe the concepts as '*placeholders,* occupying points in the design space without necessarily being the best devices to populate it' (p216, their italics). So the concepts provided starting points for exploring these design spaces, defining the contexts for new digital devices. In concluding Gaver & Martin suggest critical design practices: 'might also form the basis for new kinds of user studies [..] concept proposals could introduce speculative new ideas to potential users in such a way as to evoke general insights into their attitudes as well as more specific reactions' (p216). This is the territory my work is exploring.

Further Research

The scoping study described above informs a one year project extending the investigation. This new project includes a more diverse group of stakeholders associated with older people: active older people, frail older people, their carers and the "future old" – middle-aged people whose aspirations future products will need to satisfy. This larger study provides the context for developing a generalisable methodology for using critical artefacts instrumentally within a design process.

The above case studies both flagged potential conflicts between the roles of the designer as workshop participant and the designer as "ethnographic-like" observer. Ethnographies attempt to document a situation without changing it. However my approach involves simultaneously manipulating a situation, participating in it and observing it (as is often the case in designers' activities in research). There is also a third level in which I am operating – as a researcher developing a methodology. The wider project will provide evidence of the methods' real world effects, from which the validity of such participation-observation activities could be reasoned. It also provides an opportunity for others to take the role of designer-participant and designer-observer and increase the breadth of perspectives used to develop the methodology.

Conclusions

There is a number of emerging "critical design practices" that develop the idea of critical theory into design activity - using critical reflection on their practices to make them more "effective". For Dunne & Raby and other proponents of critical design such as "satirical designers" the critical reflection is the endpoint. Their artefacts afford critical reflection in their audiences, and it is hoped that by contributing to the wider public discourse beneficial change might occur. Other practices use critical reflection in a more instrumental way. In Sengers' reflective design and Agre's critical technical practice it is used by the practitioners themselves to ensure a more holistic, comprehensive appreciation of their design contexts. Critical aspects are used within these practices and they are less evident in their end products – unlike critical artefacts.

Through my research I am developing another possibility of critical design practice – that there is an opportunity to use critical artefacts, not simply as agents for critical reflection, but more instrumentally within human-centred design activity as "creative probes" to explore novel problem contexts. In this respect my work is closer to the low-fidelity

prototyping ideas of Ehn & Kyng than the critical theory cited by other practitioners. The two case studies presented here demonstrate that there is value in using critical artefacts in this way, although there is ongoing work remaining to develop generalisable methods to exploit this principle.

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[1] Referring to designers as makers and purveyors of "signs" rather than those involved in the study of signs.

[2] Dunne & Raby make great claims of the Walkman, '[offering] people a new kind of relationship to urban space' (p45), as being exemplar of what the design of electronic products can be. However to infer that this radical new social application of technology was somehow designed is problematic. There are several stories as to how the Walkman was devised, but none tell of Sony's desire to affect social change. The effects it produced were incidental and not consciously engineered.